Installation Restoration Program (IRP) Final Remedial Investigation Report for IRP Sites Nos. 4, 5, 7, and 14

152nd Tactical Reconnaissance Group (Currently the 152nd Airlift Wing) Nevada Air National Guard Reno Tahoe International Airport Reno, Nevada

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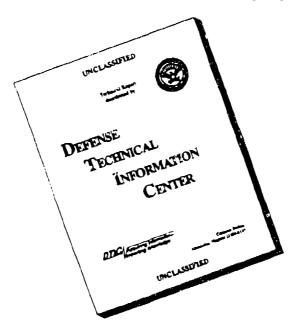
January 1996



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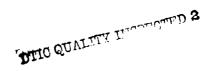
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January 1996

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LIST OF ACRONYMS

<u>Acronym</u>	Definition
1,2,4-TCB	1,2,4-trichlorobenzene
1,2-DCE	1,2-dichloroethylene
1,4-DCB	1,4-dichlorobenzene
AAWC	Airport Authority of Washoe County
AGE	Aerospace Ground Equipment
ANG/CEVR	Air National Guard/Civil Engineering Environmental
	Restoration Group
ARARs	Applicable or Relevant and Appropriate Requirements
ASG	Automated Sciences Group, Inc.
ASTM	American Standard for Testing and Materials
AWQC	Ambient Water Quality Criteria
bgs	below ground surface
BTEX	benzene, toluene, ethylene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and
GPP.	Liability Act
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethylene
DD	decision document
DERP	Defense of Environmental Restoration Program
DoD	Department of Defense
EPA	United States Environmental Protection Agency
ERM	ERM-West, Inc.
FT'A	Fire Training Area
GC H	gas chromatograph
	Henry's law constant Hazardous Wasta Remodial Actions Browns
HAZWRAP	Hazardous Waste Remedial Actions Program Integrated Rick Information System
IRIS IRP	Integrated Risk Information System
Koc	Installation Restoration Program organic carbon/water partition coefficient
LTM	long-term monitoring
MCLGs	maximum contaminant level goals
MCLs	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
NDCNR	Nevada Department of Conservation and Natural Resources
NDEP	Nevada Division of Environmental Protection
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NVANG	Nevada Air National Guard

LIST OF ACRONYMS

Acronym	Definition
OD	outer diameter
OpTech	Operational Technologies Corporation
ORNL/ETS	Oak Ridge National Laboratory/Environmental Technology
	Section
OSHA	Occupational Safety and Health Act
OWS	oil water separator
PA	preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCE	tetrachloroethylene
PEER	PEER Consultants
PID	photoionization detector
POL	petroleum, oil, and lubricants
QA/QC	Quality Assurance/Quality Control
RA	remedial action
RCRIS	Resource Conservation and Recovery Information System
RD	remedial design
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SVOC	semivolatile organic compound
TCE	trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
trans-1,2-DCE	trans-1,2-dichloroethylene
TSD	treatment, storage, or disposal
UST	underground storage tank
VOC	volatile organic compound
μg/kg	micrograms per kilogram
μg/l	micrograms per liter
μg/mg	micrograms per milligram
μl	microliters

EXECUTIVE SUMMARY

ERM-West, Inc., (ERM) conducted a Remedial Investigation (RI) at the Nevada Air National Guard (NVANG) Base in Reno, Nevada. The RI is part of the Installation Restoration Program, which is designed to investigate and remediate potentially contaminated sites on Air National Guard property.

The NVANG Base is located at the Reno Tahoe International Airport complex, approximately 5 miles southeast of downtown Reno, Nevada. The Base presently occupies approximately 60 acres of land adjacent to the northwest quadrant of the airport complex. During finalization of the RI Report, the NVANG Base underwent a change in mission and currently houses the 152nd Airlift Wing. Throughout the text, tables, and illustrations in this document, the NVANG Base is referred to using the name of its former mission (152nd Tactical Reconnaissance Group).

A Site Investigation (SI) was conducted at the NVANG Base by Oak Ridge National Laboratory/Environmental Technology Section. The results of the SI, reported in April 1994, recommended that an RI be performed at four sites at the Base: Sites 4 and 5 [Former Fire Training Areas (FTA)]; Site 7 [Petroleum, Oil, and Lubricants Storage Area(POL)]; and Site 14 [Oil Water Separator (OWS)].

ERM drilled 34 soil borings during the course of the RI field work. A total of 9 monitoring wells were also installed as part of the RI field activities. Review of data collected during both the RI and SI drilling activities suggests that the near-surface geology consists of lacustrine silty clay underlain by alluvial sand and gravel. Shallow ground water was encountered throughout the base in a semi-confined aquifer. Ground water flows toward the east or southeast at the NVANG Base.

Results of chemical analysis of soil and ground water samples collected during both the RI and SI indicates that petroleum hydrocarbons (JP-4 fuel and component compounds) have impacted both soil and ground water at the Base. Additionally, the RI identified two limited areas of ground water impacted by trichloroethylene (TCE).

Site-specific findings and recommendations based on the RI are summarized below.

Site 4 - Former Fire Training Area

An area of soil was identified in which total petroleum hydrocarbons (TPH), 1,2,4-trichlorobenzene, and 1,4-dichlorobenzene exceeded cleanup goals. In general, this area is relatively small and is located immediately upgradient from monitoring well MW05. The area of petroleum-impacted soil potentially provides a continuing source of petroleum hydrocarbons and volatile organic compounds to ground water.

An area of ground water was identified that contained TCE and benzene concentrations equal to or exceeding their respective cleanup standards. Benzene was detected at a maximum concentration of 23 micrograms per liter ($\mu g/l$) and its cleanup standard is 5 $\mu g/l$. TCE was detected at a maximum concentration of 12 $\mu g/l$ and its cleanup standard is 5 $\mu g/l$. The area of benzene and TCE contamination in ground water is also confined to the immediate vicinity of monitoring well MW05. A comparison of concentrations of these compounds in samples collected in March 1992 and July 1995 suggest that significant decreases have occurred.

The following recommendations were made based on the results of the RI:

- Long-term ground water monitoring should be performed at the site, based on the limited extent of ground water affected and based on the current declining concentration trend for TCE and benzene.
- A Feasibility Study should be performed to evaluate remedial alternatives for soil.

Site 5 - Former Fire Training Area

An area of TPH-impacted soil was identified in the immediate vicinity of monitoring well MW17. The impacted soil provides a continuing source of petroleum-derived hydrocarbons to ground water at the site. This soil area lies partially on Airport property and partially on the NVANG Base.

Benzene exceeds cleanup standards in ground water samples collected from monitoring well MW17. The maximum concentration of benzene detected in samples collected from this monitoring well was 14 μ g/l. The cleanup standard for benzene is 5 μ g/l. Review of additional data for the site suggests that benzene-impacted ground water is confined to the immediate vicinity of monitoring well MW17. A portion of this area of benzene-impacted ground water also probably

extends off Base. A comparison of concentrations of these compounds in samples collected in March 1992 and May 1995 suggests that no significant concentration changes have occurred.

Based on review of RI data, it was recommended that an FS be performed to evaluate remedial alternatives for soil and ground water at this site.

Site 7 - Petroleum, Oil, and Lubricants Storage Area

An area of petroleum-impacted soil was identified at this site. Review of the areal and vertical distributions of TPH, benzene, and other fuel component compounds suggests that the complex distribution of impacted soil is consistent with the product release history at the site. The existence of petroleum-impacted soil at the site poses a potential threat to ground water quality.

Approximately 13,500 gallons of floating JP-4 fuel (floating product) was discovered within the gravel backfill surrounding existing underground storage tanks. Product removal operations were implemented in late August 1995 through early September, during which approximately 10,000 gallons of product was removed. One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with a surface spill event. Existence of floating product at the site poses a threat to ground water quality.

An area of ground water was identified that contained benzene and bis(2-ethylhexyl)phthalate exceeding their respective cleanup standards. Benzene was detected at a maximum concentration of 1,300 μ g/l and its cleanup standard is 5 μ g/l. Bis(2-ethylhexyl)phthalate was detected at a maximum concentration of 1,700 μ g/l and its cleanup standard is 6 μ g/l. The area of ground water impacted by benzene may extend off Base. However, it is not anticipated that the benzene-impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution.

Based on review of RI data, it was recommended that an FS be performed to evaluate remedial alternatives for further product removal and for soil and ground water at this site.

Site 14 - Oil Water Separator

TPH in soils exceed cleanup standards in an area of soil at Site 14 - OWS. The distribution of the TPH-impacted soil is consistent with the

release history at Site 14 - OWS. The absence of significant volatile organic compounds in the impacted area suggests that in situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water.

It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water.

Long-term monitoring should be performed at Site 14 - OWS ground water to detect the possibility of future problems.

INTRODUCTION

ERM-West, Inc., (ERM) has prepared this report for the Remedial Investigation (RI) conducted at the Nevada Air National Guard (NVANG) Base in Reno, Nevada. The RI is part of the Installation Restoration Program (IRP) of the Air National Guard, and was performed under contract DAHA90-94-0014 between ERM and the National Guard Bureau, Department of the Army and the Air Force. The Air National Guard/Civil Engineering Environmental Restoration Group (ANG/CEVR) provided technical and project management oversight for this investigation on behalf of the ANG/CEVR.

The RI report follows the recommended ANG/CEVR format and contains the basic contents suggested in the United States Environmental Protection Agency (EPA) document Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA (EPA, 1988).

A description of planned activities performed during this RI is included in ERM's RI/Feasibility Study (FS) Workplan (ERM, 1995b). Field activities for the RI were performed during May 1995. The objectives of this RI report are to: 1) summarize the activities and present the results of the soil and ground water investigations conducted at IRP Sites 4 [Former Fire Training Area (FTA)], 5 (Former FTA), 7 [Petroleum, Oil, and Lubricants (POL) Storage Area], and 14 [Oil Water Separator (OWS)] at the NVANG Base; 2) determine the nature and extent of contamination at the IRP sites; and 3) provide recommendations for response actions. This introduction includes the following subsections:

- Site background information; and
- IRP information.

1.1 Site Background Information

The NVANG Base is located at the Reno-Tahoe International Airport complex, approximately 5 miles southeast of downtown Reno, Nevada

(Figure 1-1). During finalization of the RI Report, the NVANG Base underwent a change in mission and currently houses the 152nd Airlift Wing. Throughout the text, tables, and illustrations in this document, the NVANG Base is referred to using the name of its former mission (152nd Tactical Reconnaissance Group).

The Base presently occupies approximately 60 acres of land adjacent to the airport complex.

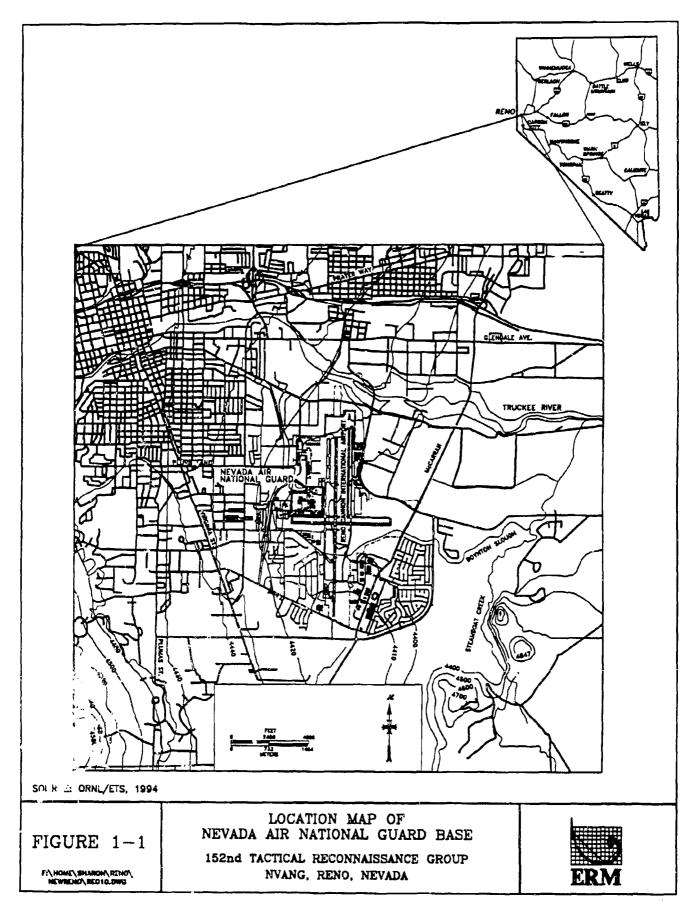
Previous IRP investigations have been performed at the NVANG Base. These investigations have included the following:

- Preliminary Assessment (PA) record search performed in 1988 by Automated Sciences Group, Inc. (ASG);
- Site Assessment performed in 1991 by PEER Consultants (PEER);
- Site Investigation (SI) performed in 1992 through 1993 by Oak Ridge National Laboratory/Environmental Technology Section (ORNL/ETS); and
- SI performed at Site 12 Aircraft Parking Apron Area in 1993 through 1994 by Operational Technologies Corporation (OpTech).

The ORNL/ETS SI confirmed the presence of soil and ground water contamination at four sites at the NVANG Base. The sites identified were sites 4, 5, 7, and 14. The SI recommended that an RI/FS be conducted. Background information regarding previous investigations at the four study sites is provided in Sections 2.1 and 2.2 of this report.

1.2 Installation Restoration Program (IRP) Information

The Defense Environmental Restoration Program (DERP) was established in 1984 to promote and coordinate efforts for the evaluation and cleanup of contamination at Department of Defense (DoD) installations. On January 23, 1987, Presidential Executive Order 12580 was issued which assigned the responsibility for carrying out DERP within the overall framework of the Superfund Amendments and Reauthorization Act (SARA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to the Secretary of Defense. The IRP was established under DERP to identify, investigate, and remediate contamination at installations. The IRP focuses on cleanup of contamination associated with past DoD activities to ensure that threats to public health are eliminated and to restore natural resources for future use.



1-3

The IRP is divided into six phases as illustrated in Figure 1-2. These phases are defined and described in the following subsections.

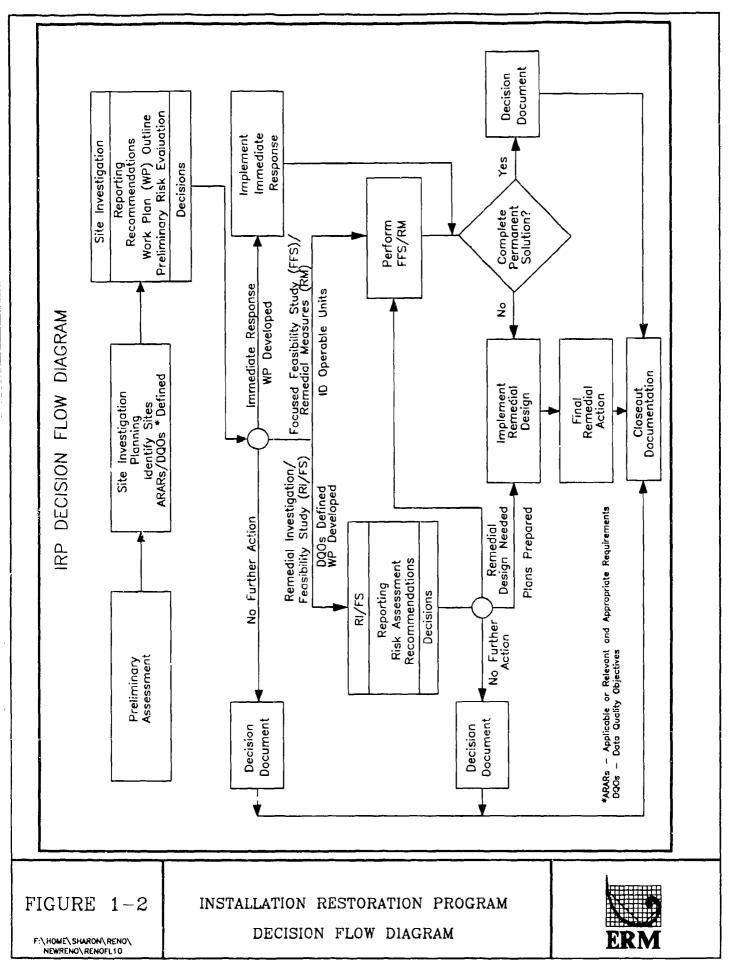
1.2.1 Preliminary Assessment (PA)

The PA process consists of personnel interviews, a record search, and site inspection designed to identify and evaluate past disposal and/or spill sites that might pose a potential or actual hazard to public health, public welfare, or the environment. Previously undocumented information is obtained through the interviews. The record search focuses on obtaining useful information from: aerial photographs, installation plans; facility inventory documents; lists of hazardous materials used; subcontractor reports; correspondence; Material Safety Data Sheets; federal/state agency scientific reports on endangered and threatened species; and critical habitats, documents from local government offices, and numerous standard reference sources.

1.2.2 Site Investigation (SI)

The SI phase consists of field activities designed to confirm the presence or absence of contamination at the sites identified and to determine potential risks to human health and the environment. The activities undertaken during the SI generally fall into three distinct categories: screening, confirmation, and optional activities. Screening activities are conducted to gather preliminary data on each site. Confirmation activities include specific media sampling and laboratory analysis to confirm either the presence or the absence of contamination, chemical concentrations, and the potential for migration of contaminants. Information obtained during the subsurface investigation is also utilized to define the installation and site hydrology, geology, and soil characteristics. Additional data may be needed to reach a decision point for a site, such as no further IRP action warranted, prompt removal of contaminants is necessitated, or further IRP work is required.

The general approach for the design of the SI is to sequence the field activities so that data are acquired and used as the field investigation progresses. This is done in order to determine the absence or presence of contamination in a relatively short period of time, optimize data collection and data quality, and keep costs to a minimum.



1.2.3 Remedial Investigation (RI)

The objectives of the RI are to determine the nature and extent of contamination at a site, determine the nature and extent of potential threats to human health and the environment, and provide a basis for determining the types of response actions to be considered [decision document (DD), FS, remedial design (RD), or remedial action (RA)].

The RI consists of field activities designed to quantify the potential contaminant, the extent of the contamination, and the pathways of contaminant migration. Field activities may include the installation of soil borings and/or monitoring wells and the collection and analysis of water, soil, and/or sediment samples. Careful documentation and quality control procedures are implemented during RI field activities in accordance with CERCLA/SARA guidelines which ensure the validity of data.

Hydrogeologic studies are conducted to determine the underlying strata, ground water flow rates, and direction of contaminant migration.

A baseline risk assessment, which provides an evaluation of the potential threat to human health, is conducted prior to implementing any RA. The risk assessment provides the basis for determining whether RA is necessary to mitigate endangerment to public health or the environment.

The findings from this study result in the selection of one of the following options:

- No Further Action (NFA): The results of investigations do not indicate harmful concentrations of chemicals that pose a significant threat to human health or the environment. Therefore, no further IRP action is warranted and a DD will be prepared to close the site.
- Long-Term Monitoring (LTM): The results of investigations do not indicate the presence of sufficient contamination to justify costly remedial action. LTM may be recommended to detect the possibility of future problems.
- FS: The results of investigations confirm the presence of contamination that may pose a threat to human health and/or the environment, and some sort of remedial action is indicated. The FS is described fully in the following subsection.

1.2.4 Feasibility Study (FS)

Based on results of the RI, the baseline risk assessment, and a review of state and federal regulatory requirements, an FS will be prepared to develop, screen, and evaluate alternatives for remediation of ground water and/or soil contamination at the site. The overall objectives of the FS include providing information necessary for remedial alternative development and evaluating information to support selection of a remedy that is protective of human health and the environment; considering applicable or relevant and appropriate requirements; satisfying the preference for treatment that significantly and permanently reduces toxicity, mobility, or volume of hazardous constituents as a principal element; and cost-effectiveness.

Activities associated with the FS include the following:

- Development of alternatives;
- Preliminary screening of alternatives;
- Detailed analysis of alternatives;
- Comparative analysis of alternatives; and
- Completion of an FS report.

The end result of the FS is the selection of the most appropriate remedial action with concurrence by state and/or federal regulatory agencies.

1.2.5 Remedial Design (RD)

The RD involves formulation and approval of the engineering designs required to implement the selected remedial action identified in the FS.

1.2.6 Remedial Action (RA)

The RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated ground water, installing a new water distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the RAs have

been completed, a LTM system may be installed as a precautionary measure to detect contaminant migration or to document the efficiency of remediation.

1.2.7 Immediate Action Alternatives

At any point, it may be determined that a site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminants. Immediate action, such as limiting access to the site, capping or removing contaminated soils, and/or providing an alternative water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or LTM. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

SITE BACKGROUND INFORMATION

This section of the RI Report includes the following:

- Site description;
- Summary of previous investigations at the NVANG Base; and
- Site descriptions for IRP sites 4, 5, 7, and 14.

Information presented in this section was derived primarily from ORNL/ETS's report entitled Site Investigation Report, 152nd Tactical Reconnaissance Group, Nevada Air National Guard, Reno Cannon International Airport, Reno, Nevada (April 1994). This information has been updated by ERM based on the RI findings.

2.1 Site Description

The Reno Tahoe International Airport complex is located approximately 5 miles southeast of downtown Reno, Nevada. The Base presently occupies approximately 60 acres of land in the southern portion of the northwest quadrant of the airport complex and employs 1,136 military personnel, of which 287 are full-time employees (ASG, 1989).

2.1.1 Base History

In April 1948, the Base was established as the 192nd Fighter Squadron. This designation was changed to the 192nd Fighter Bomber Squadron in April 1951. The unit was redesignated as the 192nd Fighter Interceptor Squadron in June 1955 and retained this designation until April 1958, when the unit was renamed the 152nd Fighter Group. In February 1961, the 152nd Fighter Group acquired its present designation, the 152nd Reconnaissance Group (ASG, 1989).

Initially, the Base was equipped with P-51 aircraft and was located at the Stead Army Air Base in Reno, Nevada. In 1953, the Base leased 29 acres of land at Hubbard Field (Reno Tahoe International Airport) from the City of Reno. Base operations were moved from Stead Army Air Base

to their present location in 1954. F-86A aircraft were assigned to the Base from 1956 until 1961 when the group converted to the RB-57 aircraft. In 1965, the Base converted to RF-101 aircraft which were flown until 1975 when the Base converted to the RF-4Cs presently being operated at the Base (ASG, 1989).

2.1.2 Adjacent Land Use

The land use to the south and west of the Base is industrial and residential. Immediately east and north of the Base is the Reno-Tahoe International Airport.

2.1.3 Waste Disposal Practices and Past Environmental Problems

The following subsections describe the hazardous materials/wastes generated, disposal practices, and past environmental incidents and problems at the NVANG Base.

2.1.3.1 Wastes Generated by Base Operations. As part of the PA of the Base, ASG reviewed base records and conducted interviews with past and present Base employees to identify specific operations where chemicals are handled and hazardous materials/wastes are generated (ASG, 1989). The major operations of the Base that have used and disposed of hazardous materials/wastes include aircraft maintenance; aerospace ground equipment maintenance; ground vehicle maintenance; petroleum, oil, and lubricant (POL) management and distribution; and air weapons control. These operations involve such activities as corrosion control, nondestructive inspection, fuel cell maintenance, engine maintenance, hydraulics, structural repair, and wheel and tire maintenance. Motor oil, engine oil, turbine oil, hydraulic fluid, recovered fuels, paint wastes, spent cleaners, acids, strippers, and solvents are generated and disposed of by the activities listed above.

2.1.3.2 Disposal Practices at Installation. The PA also identified past and present disposal methods of the wastes generated at the Base. Records to describe past waste disposal methods in the 1950s to 1980s were not available. Since the 1980s, waste disposal methods on the Base have included neutralization and disposal through the sanitary sewer, off-site disposal by a contractor, incineration during fire training activities, disposal by the Defense Reutilization and Marketing Office, disposal on the ground, returning to base supply for recovery/recycle by an independent contractor, and disposal into drains leading to the sanitary sewer.

2.1.3.3 Past Environmental Incidents and Problems. Based on interviews with past and present employees, analysis of pertinent information and Base records, and a field survey, the PA identified seven potentially contaminated disposal and/or spill sites at the Base. A more detailed description of spill/disposal incidents at the sites pertinent to this RI is provided in Section 2.3.

2.1.3.4 Regulatory Record Review. Review of existing investigation reports indicates that a regulatory record review of the Base has not been conducted. ERM contracted Environmental Risk Information & Imaging Services to provide a report on the status and locations of sites within a 1-mile radius of the NVANG Base that are included in selected environmental databases. The search indicated the presence of four facilities listed on the Resource Conservation and Recovery Information System's (RCRIS) large quantity generator list within a 1-mile radius of the NVANG Base. Eleven facilities were listed on the RCRIS small quantity generator list. Sixty-three properties, including the NVANG Base, were listed on the state registered underground storage tank (UST) file list. Twenty-three USTs were registered to the NVANG.

Three leaking UST incidents were reported within a 1-mile radius of the NVANG Base. Two of these leaking UST incidents are located northwest and upgradient of the NVANG Base. One leaking UST is within a one-half mile radius of the Base. Neither of these leaking UST sites have reached case closure status.

2.2 Previous Investigations

The following sections and Table 2-1 summarize previous investigations conducted as part of the IRP at the NVANG Base. The sites are illustrated on Figure 2-1.

2.2.1 IRP

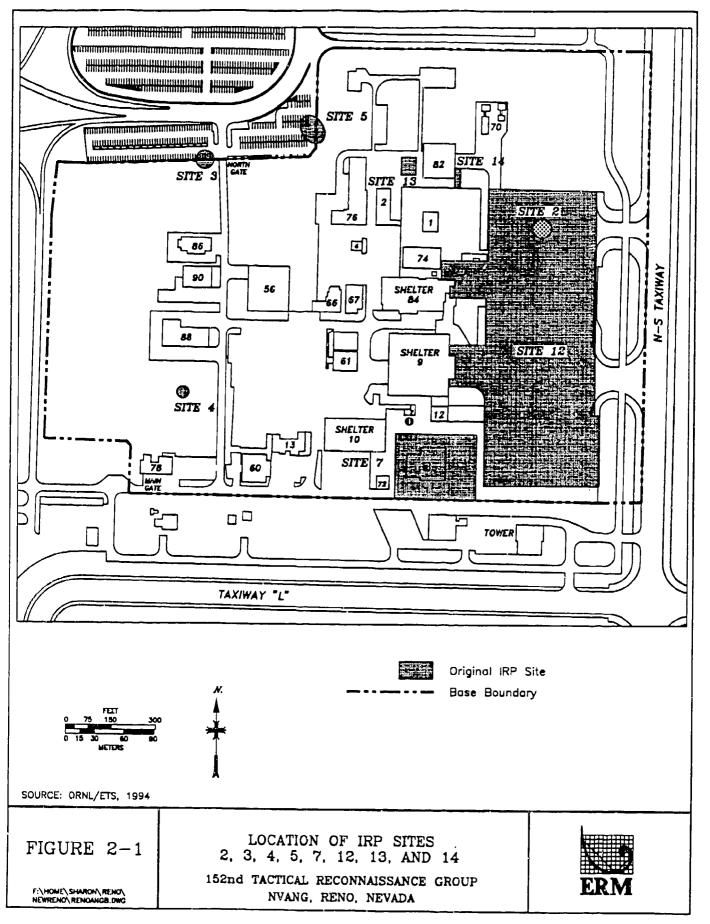
The following is a summary of the PA and SI conducted at the NVANG Base.

2.2.1.1 PA. A PA was conducted at the Base in June 1988 by ASG. It focused on past and present generation, use, handling, and disposal practices of hazardous waste and materials. Based on the results of the PA, seven sites were identified as potentially contaminated with

TABLE 2-1

Summary of Previous Investigations 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Date	Investigators	Sites	Work Performed
January 1989	Automated Sciences Group, Inc.	1 through 7	Preliminary Assessment
October 1991	PEER Consultants	12	Rapid Response Site Assessment
April 1994	Oak Ridge National Laboratory/Environmental Technology Section	2, 3, 4, 5, 7, 13, and 14	Site Investigation
June 1994	Operational Technologies Corporation	12	Site Investigation
April, July, and September 1994	Oak Ridge National Laboratory/Environmental Technology Section	Not applicable	Quarterly Monitoring of eight Monitoring Wells
January 1995	Environmental Resources Management-West, Inc.	Not applicable	Quarterly Monitoring of eight Monitoring Wells



hazardous materials/waste and were recommended for further IRP investigations. The sites were as follows:

- Site 2 Former FTA;
- Site 3 Former FTA:
- Site 4 Former FTA:
- Site 5 Former FTA;
- Site 7 POL Storage Area;
- Site 13 Storm Drain at Aerospace Ground Equipment (AGE) Storage Lot; and
- Site 14 OWS at Building 82.

2.2.1.2 SI. An SI was conducted at the NVANG Base by ORNL/ETS under agreement with the Hazardous Waste Remedial Action Program (HAZWRAP) operated by Energy Systems, Inc. in Oak Ridge, Tennessee. The results of the SI were reported in April 1994. The SI focused on five of the sites identified in the PA and two additional sites identified by Base personnel (Figure 2-1).

The IRP sites below were part of the SI, and a NFA DD was recommended.

- Site 2 FTA: No ground water contamination was present at the site, soil contamination was below the Nevada Division of Environmental Protection (NDEP) soil remediation criteria, and le site was part of the investigation of Site 12 Aircraft Parking Apron Area. Therefore, a NFA DD was recommended. The installation of an additional monitoring well downgradient of the site was recommended to confirm the origin of downgradient ground water contamination and to support a NFA DD for ground water.
- Site 3 Former FTA: Due to the absence of soil and ground water contamination, a NFA DD was recommended.
- Site 13 Storm Drain at the AGE Storage Lot: Due to the absence of soil and ground water contamination above any remediation standards, a NFA DD was recommended.

An RI/FS was recommended for IRP Sites 4, 5, 7, and 14. These sites are discussed in Section 2.3.

2.2.2 Other Investigations

Although Site 12 - Aircraft Parking Apron Area was not identified in the IRP PA for the Base, it has been investigated by OpTech. An SI was initiated due to fuel odors detected during a routine replacement of one of the concrete slabs at the aircraft parking apron on the site. The investigation began in October 1993 and was completed in January 1994.

Site 12 - Aircraft Parking Apron Area is located at the southeast corner of the NVANG Base (Figure 2-1). The site is an open parking apron approximately 360 by 1,020 feet. There are five areas, approximately 100 by 325 feet, where aircraft are parked, serviced, and refueled. Two JP-4 spills were reported, one occurring in the 1970s and one in 1986. According to the Environmental Pollution Incident Report, a spill of an estimated 40 gallons of JP-4 occurred at the south end of the parking apron on August 1, 1986. Records of the spills were not required in the 1970s and no data is available for this time period. Numerous spills were reported around the POL storage facility (Building 6) to the west of the site, mostly between 1973 and 1985. Fuel spills of up to 1,000 gallons have occurred in this area. Prior to the early 1980s, most of these spills were flushed into the soil/gravel areas surrounding the refueling stand (ASG, 1989).

Site 12 - Aircraft Parking Apron Area is important because of its proximity to IRP Site 7 - POL Storage Area and because it incorporates IRP Site 2 - Former FTA. IRP Site 2 - Former FTA is located in the northern portion of the Aircraft Parking Apron Area, and IRP Site 7 - POL Storage Area is located adjacent to the southwest corner of the Aircraft Parking Apron Area.

Prior to the OpTech investigation, two investigations had been conducted at these three sites. PEER conducted a Rapid Response Site Assessment in October 1991 to investigate hydrocarbon contamination discovered during replacement of a portion of the aircraft parking apron of Site 12. ORNL/ETS subsequently investigated Site 2 - Former FTA and Site 7 - POL Storage Area during the investigation of seven IRP sites from September 1992 through March 1993.

Benzene, toluene, ethylene, and xylene (BTEX) were detected in 70 of 150 soil vapor samples analyzed by OpTech. BTEX and total petroleum hydrocarbons (TPH) were detected in soil samples at concentrations less than Nevada Department of Conservation and Natural Resources (NDCNR) cleanup levels. TPH and benzene concentrations detected in soil samples collected during the PEER and ORNL/ETS investigations exceeded NDCNR cleanup levels. Lead was detected by OpTech in all soil samples at concentrations below the mean background concentration reported by ORNL/ETS. Lead at concentrations

exceeding the federal drinking water standard were detected in ground water samples collected by OpTech from five monitoring wells on the site. Significant microbiological activity was also detected underneath the site. Hydrocarbon degrading bacteria were not present in the analyzed samples.

2.2.3 Ground Water Monitoring

A quarterly ground water monitoring program was instituted at the NVANG Base in 1994. Prior to the start of RI field work in May 1995, a group of eight monitoring wells (MW06, MW07, MW08, MW23, MW24, MW25, MW26, and MW27) were sampled in April, July, and September 1994 and January 1995. Data collected during these quarterly rounds have been summarized in quarterly monitoring reports prepared by ORNL/ETS and ERM. ERM (1995a) summarizes the results of quarterly monitoring performed up through the January 1995 round. Ground water samples were collected for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and TPH. Ground water elevations were also measured in the eight monitoring wells.

2.3 IRP Site Descriptions

The following sections describe IRP sites 4, 5, 7, and 14, which were investigated during the RI.

2.3.1 IRP Site 4 - Former FTA

The following is a description of IRP Site 4 - Former FTA, including past uses, release history of the site, and results and recommendations of the SI conducted by ORNL/ETS.

2.3.1.1 Description. Site 4 - Former FTA is located on land leased by the Base south of Building 88 and is currently used as a baseball field. The Base was the sole operator and used this area in conjunction with Site 5 (Former FTA 5) from 1970 to 1973. FTA 4 is a flat, open earthen area, slightly bermed to contain the flammable liquids used during training exercises.

2.3.1.2 Release History. Spent solvents, waste oils, "slop wastes," JP-4 fuel, and other flammable liquids were burned during training exercises in this area. A water base was applied to the FTA prior to each burn.

Training exercises were conducted on an "as needed" basis, estimated at once or twice a year. An estimated 150 gallons of flammable liquids per burn were used. On the basis of two burns per year, it is estimated that 300 gallons per year of flammable liquids were used. Assuming 70 percent of the flammable liquids used were destroyed during training exercises, an estimated 90 gallons of flammable liquids remained per year to evaporate or infiltrate the ground. Based on this assumption, an estimated maximum of 270 gallons of flammable liquids may have infiltrated the ground during the 3-year period that this FTA was in use (ASG, 1989).

2.3.1.3 SI Findings and Recommendations. Five soil borings and three monitoring wells were drilled at Site 4 - Former FTA (Figure 2-2). Tables 2-2 and 2-3 present the results of soil and ground water sample analyses. Analytical results of Site 4 - Former FTA soil samples indicated the presence of elevated concentrations of fuel-related VOCs (benzene, ethylbenzene, and xylenes). Additionally, elevated concentrations of TPH were detected in the soil samples.

VOCs were detected in ground water samples collected from monitoring wells located at Site 4 - Former FTA. Compounds detected include acetone, methylene chloride, BTEX. and trichloroethylene (TCE). Of these, only benzene and TCE were detected at concentrations exceeding the current maximum contaminant levels (MCLs).

Several SVOCs were also present in the ground water samples. ORNL/ETS did not consider detection of bis(2-ethylhexyl)phthalate to be significant due to the relatively low concentrations reported, the compound's ubiquity in the environment, and its use at the analytical laboratory. The remainder of the SVOCs reported consists of polynuclear aromatic hydrocarbons (PAHs) that were inconsistently detected at very low concentrations that did not exceed applicable MCLs.

Due to the presence of soil contamination above NDEP remediation criteria for TPH and VOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene and TCE, the SI recommended an RI/FS for IRP Site 4 - Former FTA.

2.3.2 IRP Site 5 - Former FTA

The following is a description of IRP Site 5 - Former FTA, including past uses and release history of the site.

2.3.2.1 Description. Site 5 - Former FTA is located between the northwest corner of Building 76 and the southeast corner of the

TABLE 2-2 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada Organic Compounds Detected in Site 4 - Former FTA Soil

Ethylbenzene 1,300 J VOCs, µg/kg Methylene chloride 1,900 J 1,300 J 72 Xylenes 4,600 J 72 J 2 J Xylenes 2,500 J 4,600 J 170 J 2 J Actone Actone 1 J 2 J 1,000 J 170 J 2 J Benzene Senzene SVOCs, µg/kg 2 J 2 J 2 J 2 J bis(2-Ethylhexyl) 170 J 180 J 590 J 230 J 190 J 120 J 37 J 83 J 590 J 2-Methylnaphthalene 510 J 2 J<	Chemical	BH12-2	BH12-2 BH12-6	BH12-8	BH13-2	BH13-4	BH13-8	BH14-4	BH14-6	BH14-8	BH15-2	BH15-6	BH12-8 BH13-2 BH13-4 BH13-8 BH14-4 BH14-6 BH14-8 BH15-2 BH15-6 BH15-6D
Idoride 1,300 J 72 400 J 72 1 Idoride 1,900 J 1,900 J 170 2 J 1 Idoride 4,600 1,900 J 170 2 J 1 Idoride 1,000 J 1,200 J 1,200 J 1 1 Idhalene 910 1,201 J 330 J 73 J 500 J 97 J Inthalene 910 1,500 J 1,500 J 1,200 J 1,2						VOCs, µg	:/kg						
Horide 1,900 J 1,900 J 1,000 J 170 ZJ 2J 4,630 4,630 1J 2J 1,000 J 170 ZJ 2J xyl J 170 J 180 J 230 J 120 J 2J 1,800 J 170 ZJ xyl J 170 J 180 J 230 J 190 J 120 J 330 J 73 J 83 J xyl J 170 J 180 J 230 J 190 J 120 J 2100 J 2100 J 120 J 120 J 1200 J 120 J	Ethylbenzene			1,300 J						4001	22		
1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,00 1,000	Methylene chloride			1,900 J									
Not Sol Sol	Xylenes			4,600						1,000,1	170	23	
xy1) 170 J 180 J 590 J 230 J 120 J 330 J 73 J 500 S 97 J 83 J hthalene 910 1,500 0 1,200 0 45 J 0 <td>Chloroform</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>17</td> <td>2.3</td> <td></td> <td></td> <td></td> <td></td>	Chloroform							17	2.3				
SVOCs, µg/kg SVOC	Acetone									1,800			
SVOCs, µg/kg exyl) 170 J 180 J 590 J 230 J 190 J 120 J 330 J 73 J 500 P 97 J 83 J thhalene 910 0.00 J 1,500 0.00 J	Benzene										51		
exy1) 170 J 180 J 590 J 230 J 120 J 330 J 73 J 500 P7 J 83 J hthalene 910 0.00 J 0.00 J <t< td=""><td></td><td></td><td></td><td></td><td></td><td>SVOCs, IL</td><td>2/kg</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>						SVOCs, IL	2/kg						
hthalene 910 1,200 2,100 451	bis(2-Ethylhexyl)	170 J	180 J	590 J		190]	120]	330 J	73]	200	126	83]	590
m 0.01 J 500	2-Methylnaphthalene			010	1					900			
m 0.01 J 630	Manhthalone		1		†	+		†		1,400			
m 0.01 J 630 120 0.10 J 3,800 9.20 0.39 J	ivapilillalene			005/1	1					2,100			
m 0.01 j 630 7.01 j 3,800 9.20 0.39 j	Fyrene			_					_		451		
m 0.01 j 630 120 0.10 j 3,800 9.20 0.39 j	Phenol												52.1
m 0.01 J 630 120 0.10 J 3,800 9.20 0.39 J				1		TPH, mg/	ĘĘ,						
	Total Petroleum	0.01	-	630			120	0.101		3.800	920	10% 0	250
	Hydrocarbons			•				ì		-	}		}

Soil samples collected in December, 1992.

Blank space indicates compound was not detected or was flagged unusable during data validation.

D = indicates duplicate sample

J = Reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

Hg/kg = micrograms per kilogram

ng/kg = nulligrams per kilogram

Source: ORNI_/ETS SI Report (1994)

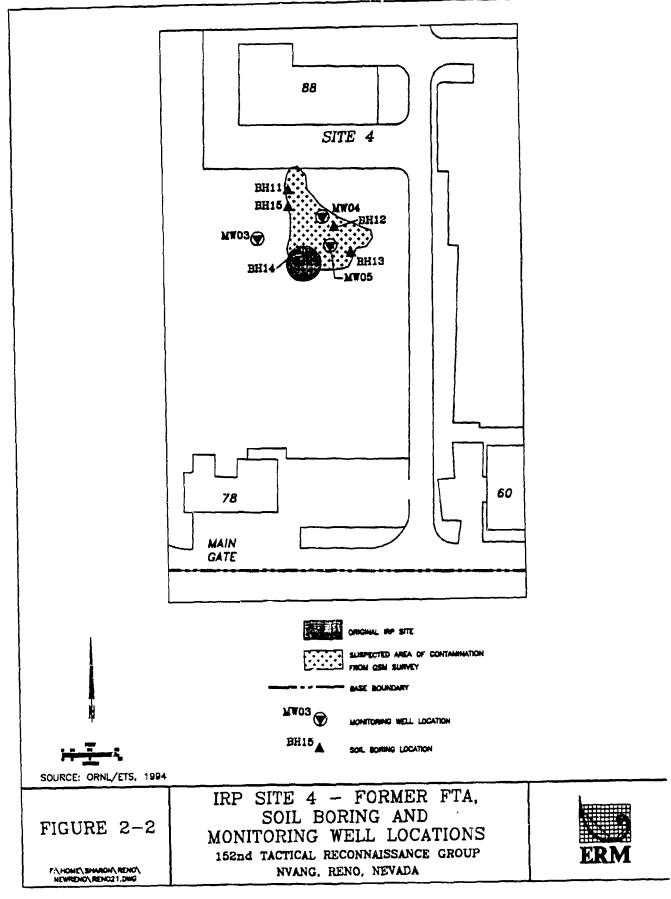
TABLE 2-3 Organic Compounds Detected in Site 4 - Former FTA Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	MW03	MW03	MW04	MW04	MWDE	MWOS	MIMOE	MINOE
Chemical	12/1/92	3/3/92	12/1/92	3/3/92	12/1/92	12/1/92 D	3/3/92	3/3/92 D
			NOC	VOCs, µg/i				
Benzene					18.0	17.0	24.0	23.0
Ethylbenzene					17.0	12.0	27.0	24.0
Toluene					24.0	21.0	37.0	33.0
Trichloroethylene					20.0	14.0	8.0	9.0
Xylenes					210.0	200.0	450.0	450.0
Acetone				2.0 J				
Methylene chloride				3.0				
			SVOC	SVOCs, µg/1				}
1,2-Dichlorobenzene					1.0	2.0	5.0	11.0
1,3-Dichlorobenzene							2.0	3.0
1,4-Dichlorobenzene							2.0	4.0
2-Methylnaphthalene							2.0	4.0
2,4-Dimethylphenol					2.0	1.0		
bis(2-Ethylhexyl) phthalate						58.0 J		
Butylbenzyl								2.0
phthalate								ì
Di-n-butyl phthalate								2.0
Naphthalene					6.0	6.0	9.0	17.0
			TPH	TPH, mg/l				
Iotai Petroleum					1.2	0.74	2.4	0.74
Hydrocarbons							•	

Blank space indicates compound was not detected

D = indicates duplicate sample

] = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities. μg/l = micrograms per liter mg/l = milligrams per liter Source: ORNL/ETS SI Report (1994)



Airport Authority of Washoe County (AAWC) parking lot on land leased by the Base. The Base was the sole operator and used this FTA in conjunction with Site 4 - Former FTA, as described above, from 1970 to 1977. This FTA consisted of a flat, unlined, open earthy area, slightly depressed, and bermed around the edges to contain the flammable liquids used during training exercises. A mock-up model of an aircraft was used during training at this site.

2.3.2.2 Release History. Spent solvents, waste oils, "slop wastes," JP-4 fuel, and other flammable liquids were used during joint training exercises with the AAWC and the Base supplying the flammable liquids for the burns. A water base was applied to the FTA prior to ignition of each burn.

An estimated ten fire-training exercises per year were conducted at this FTA. An estimated 150 gallons of flammable liquids per burn were used. Based on ten burns per year, it is estimated that 1,500 gallons per year of flammable liquids were used. Assuming that 70 percent of the flammable liquids released at FTA 5 were destroyed, an estimated 450 gallons per year of flammable liquids remained to evaporate or infiltrate the ground. Based on this assumption, an estimated maximum of 3,200 gallons of flammable liquids may have infiltrated the ground during the 7-year period that this FTA was in use (ASG, 1989).

2.3.2.3 SI Findings and Recommendations. Five soil borings and three monitoring wells were drilled at Site 5 - Former FTA (Figure 2-3). Tables 2-4 and 2-5 present the results of soil and ground water sample analyses. Fuel-related VOCs (ethylbenzene and xylenes) were detected in several soil samples collected from soil borings drilled at Site 5 - Former FTA. Additionally, elevated concentrations of TPH were detected in some samples.

VOCs were detected in ground water samples collected from monitoring wells located at Site 5 - Former FTA. Compounds detected included BTEX and 1,2-dichloroethylene (1,2-DCE). Of these, only benzene was reported at concentrations exceeding the current MCLs.

Two SVOCs were also detected in the ground water samples. The SI did not consider detection of bis(2-ethylhexyl)phthalate significant due to the relatively low concentrations reported, the compound's ubiquity in the environment, and its use at the analytical laboratory. The presence of naphthalene was considered insignificant due to its low estimated concentration.

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TABLE 2-4

Organic Compounds Detected in Site 5 - Former FTA Soil 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	BH06-2	BH06-4	BH06-6	BH07-2	BH08-6	BH08-7	BH09-2	9-60HB	BH09-7	BH10-2	BH10-8	BH10-9
				VOCs,	VOCs, µg/kg							
Chloroform				11					21			
Acetone			1,900 J		141	121						
Methylene chloride			4,200]									
Ethylbenzene		_	1,800 J									
Xylenes			6,700									
				SVOCs	SVOCs, ug/kg							
2-Methylnaphthalene			3,300									
Fluorene			1101									
Naphthalene			2,400									}
bis(2-Ethylhex1)	62 J	180 J	500 J	250 J	230 J	220 J	190 J	210J	2003		260 J	250 J
Benzo[a]anthracene	521	411										
Benzo[a]pyrene	52.)											
Benzo[b]fluoranthene		63]										
Benzo[g,h,i]perylene	(88											
Benzo[k]fluoranthene	186											
Chrysene	48]											
Dibenz[a,h]anthracene		411										
Fluoranthene	4		18									
Indeno[1,2,3-cd]pyrene	39]											
Phenanthrene	58.j											
Ругепе	73 J	βĵ	[89]									
				TPH, mg/kg	ng/kg							
Total Petroleum Hydrocarbons			2,166.45					19	0.08 J	6.6		0.02 J

Soil samples collected in December, 1992 Blank space indicates compound was not detected or was flagged unusable during data validation.] = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

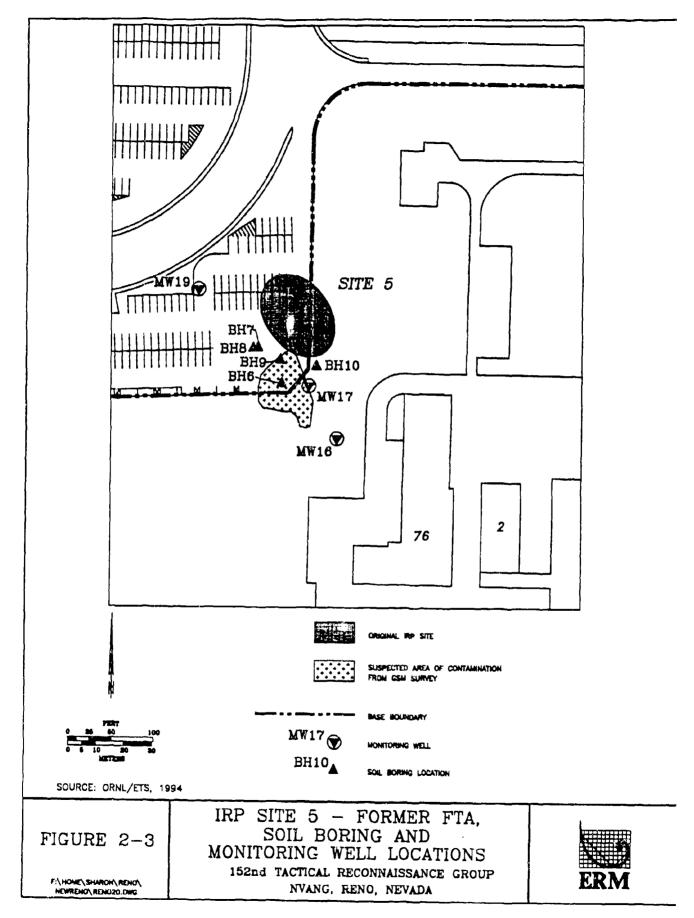
µg/kg = micrograms per kilogram mg/kg = milligrams per kilogram Source: ORNL/ETS SI Report (1994)

TABLE 2-5

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada Organic Compounds Detected in Site 5 - Former FIA Ground Water

	MW16	91WM	MW16	MW16	MW17	MW17	MW19	MW19
Chemical	12/4/92	12/4/92 D	3/5/92	3/5/92 D	12/3/92	3/5/92	12/1/92	3/5/92
			VOC	VOCs. ug/ml				
Acetone								
Benzene	1.0 J	1.0 J			201	15.0		
Ethylbenzene					4.01	24.0		
Xylenes					12.0	7.01		
Toluene					7.01	1.01		
1,2-Dichloroethylene					201	4.01		
			SVOC	SVOCs, µg/l		,		
bis(2-Ethylhexyi) phthalate	1.0 J	1.0 J				20.0 J		
Naphthalene						1.01		
			TPH	TPH, mg/l				
Total Petroleum					0.1	0.15		
Hydrocarbons								

Blank space indicates compound was not detected $D=\inf\{0\}$ in above the instrument detection limit. Values are estimated quantities. ug/l = micrograms per liter mg/l = milligrams per liter Source: ORNL/ETS SI Report (1994)



Due to the presence of soil contamination above NDEP remediation criteria for TPH and VOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene, the SI recommended an RI/FS for IRP Site 5 - Former FTA.

2.3.3 IRP Site 7 - POL Storage Area

The following is a description of IRP Site 7 - POL Storage Area, including past uses and release history of the site.

- 2.3.3.1 Description. Site 7 POL Storage Area surrounds Building 6 and consists of four 25,000-gallon USTs holding JP-4 fuel for flight line operations and ancillary equipment. These JP-4 fuel USTs have been in the ground for over 30 years (ASG, 1989, Appendix F). Visual inspections have been made periodically, the last one in April 1986, to ascertain the condition of these USTs. The inspections revealed medium rusting with light pitting on the interior surfaces of the USTs.
- 2.3.3.2 Release History. Numerous small JP-4 fuel spills have occurred around the refueling stand area of Building 42. Most of the spills occurred between 1973 and 1985, when the fuel trucks were top-loading vehicles. On several occasions, JP-4 fuel spills of up to 1,000 gallons occurred in this area. A fuel spill of up to 300 gallons occurred in June 1986 when a bottom-loading shutoff valve on a refueling unit failed to operate properly. Other smaller spills of up to 100 gallons have occurred during defueling of fuel trucks. Prior to the early 1980s, most of these spills were flushed into the soil/graveled areas surrounding the refueling stand (ASG, 1989).
- 2.3.3.3 SI Findings and Recommendations. Five soil borings and six monitoring wells were drilled at Site 7 POL Storage Area (Figure 2-4). Tables 2-6 and 2-7 present the results of soil and ground water analyses. Analytical results from Site 7 POL Storage Area indicate the presence of elevated concentrations of fuel-related VOCs (BTEX) in the soil. Additionally, elevated concentrations of TPH were detected in the soil samples. The occurrence of numerous PAHs suggested that these compounds are derived from the identified fuel contamination.

Analytical results of ground water samples indicate significant VOC contamination at Site 7 - POL Storage Area, most of which is related to floating product at the site. The SI concluded that the source of the floating product appeared to be limited to the immediate area and not related to the upgradient JP-4 fuel tanks. Product thickness in monitoring well MW07 averaged less than 2 inches, which, when converted to actual thickness on the water table by dividing by four,

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TABLE 2-6

Organic Compounds Detected in Site 7 - POL Storage Area Soil 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

BH31-8				230 [004,	Ī			1,300			1		Ī			T			Ī			930		1501				210 [2,800
		+	1	+	+	┪	+		\dashv	ł	_	+	+	+	+	+	+	-	+	+	+	+	+		╁	╀		-			Ì		
BH31-				670 I		24,000	82,000	<u>8</u>			20,000														13,000				320		190		
BH31-5		1,200 J				8	2,600				200											Ì			1700		-86				180 J		
ВН31-2				1		7												110)															
BH30-8							51											100 J															3.1 J
BH30-5		1,300]				2,300	8,200				240]		8		120		138	88 1		67.1		130]			1001	ร		1201					570
BH30-2 BH30-5 BH30-8 BH31-2 BH31-5 BH31-5D			120]	4.)		8 J	35				1,600							91)							1 300				74.				5.8
II B																		110]				491				13							0.06 j
H2 BH28-5 BH28-8 BH29-2 BH29-5 BH29-5D BH29-7					2.1													120 J							1	12.							
H29-5 B	VOCs, µg/kg	-	38.)	_						SVOCs, µg/kg			44 j					150 J				%			+	1301	+	3				TPH, mg/kg	
H29-2 B	VOCs	-	-							SVOC			40 J		57.1		57]	100 J		52]		110			\dagger	1301	+	191	 		-	開	2
8H28-8 B		1,1001,1				1,100 J	2,600	520 J			2,000 J						_					300 j			1,007,1	101		¥30.					1,600
H28-5		-	78 J	14]	4)	320	1,500	140				20 J	110 [110]		110 J	110 J	52.3	130 J		210 J			67.0	1000	1022	1 25	129	72.1			290
3H28-2 B		81	-	19	3.7	₹,	\vdash	33	485		183]		280	280	850	310]	850 J	380 J	82]	099	48]	800	99.1	300 J	1000	3 6	8 2	8	3 2	Ē			9.6]
BH27-2 BH27-5 BH27-5D BH28				2 J	2)	120	420				009		73]	47]	110 J		110]	520		73 J		150)			1,502	3 5	132	1 52	† 	Ţ			33
27-5 BF		L		31	4	E F	782 782		_		480			_		-		0/		70)	_				_ ز	1		+	$\frac{1}{1}$	H			87
2 BH		F	-	3	4	5	├	╀╌	-		-	\vdash	_		011		J 110)	5.]	-		0 130)	<u> </u>	320	+	╁	+	┿	}_	+	{	-
BH27.		L	L				44,000		L		13,000	L	5,200	4,600	000'6	2,600	000′6		1,700	6,300		13,000	1,000	2,700 J	12	3(1)	71,000	15	300	200	-		2,500
cal						 					2-Methylnaphthalene	lou	hracene	ene	Benzo[b]fluoranthene	erylene	Benzo[k]fluoranthene	exyl)			น	 		.1		الد	all life		94		Inhenol		rum ss
Chemical		2-Butanone	Acetone	Benzene	Chloroform	Ethylbenzene	Xylenes	Toluene	Dibenzofuran		dethy lnap	4-Methylphenol	Benzo[a]anthracene	Benzo[a]pyrene	onli[d]ozi	Benzo[g,h,i]perylene	nzo[k]lino	bis(2-Ethylhexyl) phthalate	Carbazole	Chrysene	Dibenzofuran	Fluoranthene	Fluorene	Indeno[1,2,3-	ca pyrene	Naplitalaielle	Phenanthrene	Durono	Acenanhibene	Anthracene	2 4-Dimethylphenol		Total Petroleum Hydrocarbons
		2-B	¥	쿒	ਨੁ	Ech	×	Ē	ă		2-N	4 5	Ber	Ber	Æ	æ	Ber	bis ph	ğ	ਤੁ	ä	H	Hu	lnd i	g	2	a d		Y V	4	2		ToT

Soil samples collected in December, 1992

Blank space indicates compound was not detected.

D = indicates duplicate sample

I = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

1g/kg = micrograms per kilogram

Organic Compounds Detected in Site 7 - POL Storage Area Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada TABLE 2-7

Chemical	MW06 12/6/92	3/6/92	MW67 12/6/92	MW67 3/6/92	MW10 12/6/92	MW10 3/6/92	MW23 12/6/92	MW23 3/6/92	MW24 12/6/92	MW24 3/6/92	MW25 12/6/92	MW25 3/6/92
					VOCs. ued	5						
Acetone												
Benzene	21	29	2,300	2,100							00.7	ş
Caroazole											070	3 2
Chloroform		1.0.1								101		
Ethylbenzene		55	88	88						1.0		
Methylene chloride			76 j	51.1								=
Xylenes	63	23	1,400	1,000							8	8
Toluene	6.0 J	1.01					201		100		7%	A S
Trichloroethylene	1.0)								707		, (V.)	0.0
1,2-Dichloroethane	2.0]											
1.2-Dichloroethylene					105	201						
Phenol	2.0]											
					SVOCE HOL	10						
Acencphthene				3301								
Anthracene				2601							1.0	607
2-Methylnaphthalene		3.0 I	096	0096							1.0	100
Fluoranthene			76.1	7007							3.0	200
Fluorene				300						O. T.	10.1	
2,4-Dimethylphenol		1.0 J									103	2
bis(2-ethylhexyl)	17.1			1901			101		301		3.0)	200
phthalate				}			-		3.0)		19.0	
enzo[a]anthracene				3301								
Benzo[a]pyrene				1 <u>8</u> 61								
Benzo b fluoranthene				320 I								
Benzo[k]luoranthene				320 [
Chrysene				380								
Diethylphthalate							101		100			
Dibenzofuran				1801			+		10:1			
Phenol		4.01									2)2	0.7
Di-n-butylphthalate	2.0]										77	75
Naphthalene		6.6 j	040	006'9			\uparrow				0.1	5
Phenanthrene			183	7601							0.0	27
Pentachlorophenoi									1		3:01	707
Pyrene			196	780]								
					TFH me/	-						
Total Petroleum	95.0	1.6	82	14.0		0.05 J					26	1.8
nydrocarpons				_					_			•

Blank space indicates compound was not detected

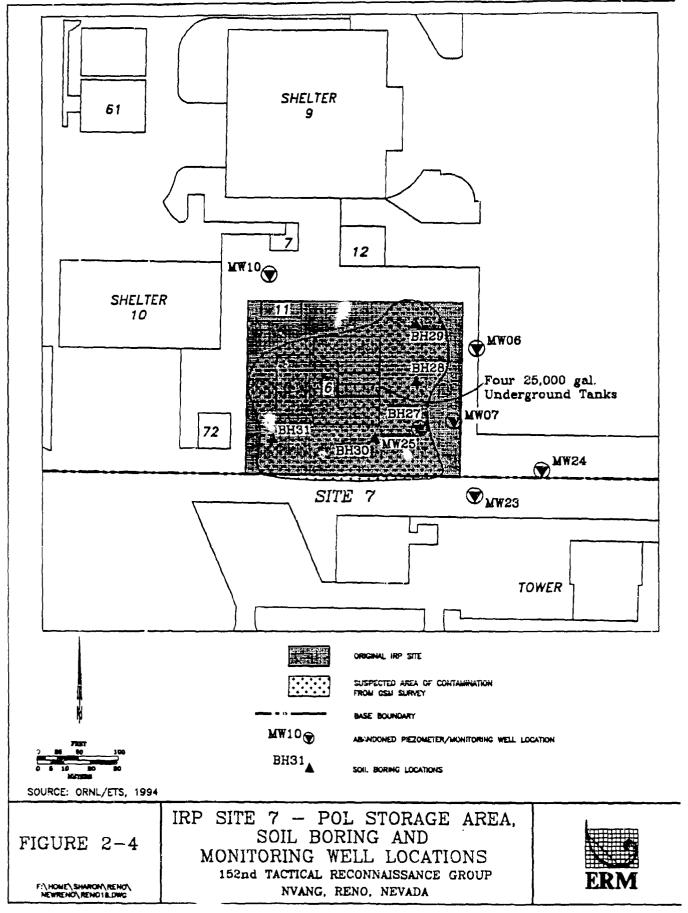
I = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

1 = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

1 = reported value is perfect required detection limit but above the instrument detection limit. Values are estimated quantities.

1 = reported value is perfect required detection limit but above the instrument detection limit. Values are estimated quantities.

2 = reported value is perfect required detection limit but above the instrument detection limit.



equals the NDEP removal-action guideline of 0.5 inches actual thickness. To mitigate the floating-product situation in monitoring well MW07, periodic product-thickness measurement and bailing were being performed by NVANG Base personnel. Compounds detected include BTEX, 1,2-DCE, 1,2-dichloroethane, chloroform, and methylene chloride. Of these, only benzene was detected in ground water at concentrations exceeding the current MCLs.

The presence of PAHs in the ground water suggests that the source of these compounds is fuel-related. With the exception of benzo[a]pyrene, none of the PAHs reported in Site 7 - POL Storage Area ground water have current or proposed MCLs. Benzo[a]pyrene, which was detected at 190 micrograms per liter (μ g/l) in ground water samples collected from monitoring well MW07, exceeds the proposed MCL of 0.2 μ g/l.

Due to the presence of soil contamination above NDEP remediation criteria for TPH, VOCs, and SVOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene, the SI recommended an RI/FS for IRP Site 7 - POL Storage Area.

Following the SI, three ground water sampling events were conducted by ORNL/ETS (April and July 1994) and by ERM (January 1995) at nine monitoring wells at the NVANG Base, including five monitoring wells located at IRP Site 7 - POL Storage Area. During the ground water sampling rounds conducted by ORNL/ETS, decaying floating-phase fuel product was encountered in monitoring wells MW07 and MW25 at IRP Site 7 - POL Storage Area. To mitigate the floating product situation, periodic product thickness measurement and bailing were performed by NVANG Base personnel. The program of product removal from monitoring well MW07 was successful in reducing the thickness of floating product in the well. Froduct thickness was approximately 3 inches when the bailing program first began in March 1993. By January 1995, product thickness was reduced to a nonmeasurable amount (i.e., sheen). Observations made during the RI field work in May 1995 indicated that only a sheen remained on the water surface.

During an annual UST testing event, free product was encountered near the USTs located at IRP Site 7 - POL Storage Area. NDEP requested that the NVANG Base install a product removal system in Spring 1995. A product removal well was installed in May 1995 in conjunction with RI field work. The product removal system was installed in June 1995 and is currently operating by removing product to a storage tank. The product is periodically removed from the storage tank by a contractor.

2.3.4 IRP Site 14 - OWS

The following is a description of IRP Site 14 - OWS, including past uses and release history of the site.

2.3.4.1 <u>Description</u>. Site 14 - OWS was not included in the PA. Base personnel discovered a JP-4 fuel spill area in May 1991 when the 1,000-gallon OWS adjacent to Building 82 exceeded its holding capacity, causing the trough system to back up and overflow. Site 14 - OWS consists of an unprotected soil area at the southeast corner of Building 82 that received the overflow.

2.3.4.2 Release History. Base personnel estimate that approximately 25 to 50 gallons have spilled onto the soil area once or twice a year since 1975. Consequently, as much as 1,600 gallons of JP-4 fuel may have reached the soil area.

2.3.4.3 SI Findings and Recommendations. Six soil borings and two monitoring wells were drilled at Site 14 - OWS (Figure 2-5). Tables 2-8 and 2-9 present the results of chemical analysis of soil and ground water samples. Results of chemical analysis of soil samples collected from borings drilled at Site 14 - OWS indicate the presence of elevated TPH concentrations in soil in the area around the OWS.

No significant concentrations of VOCs were detected in ground water samples collected from monitoring wells located at Site 14 - OWS. Carbon disulfide, a common laboratory solvent, was detected in one sample at a concentration of $2\,\mu g/l$, along with low levels of phthalate. The SI concluded that detection of these compounds was indicative of laboratory contamination rather than environmental contamination.

Due to the presence of soil contamination above NDEP soil remediation criteria for VOCs, SVOCs, and TPH, the SI recommended an RI/FS for IRP Site 14 - OWS.

TABLE 2-8

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada Organic Compounds Detected in Site 14 - OWS Soil

VOCs, μg/kg Ovide 3.1 11.1 11.1 Ovide 13 2.3 11.1 Inalenc 28,000 SVOCs, μg/kg 2,200.1 xyl) 216.3 2,200 xyl) 210.3 2,200 m 0.11 2,600 110 4.1 1,700 330	Chemical	BH21-4	BH21-4 BH21-8 BH21	BH21-8D	1-8D BH22-4 BH22-6 BH22-8	BH22-6	BH22-8	BH23-4	BH23-6	BH23-8	BH24-4	BH24-8	BH25-6	BH23-8 BH24-4 BH24-8 BH25-6 BH26-8
volume 3 J VOCs, μg/kg conide 13 11 J 11 J conide 13 2.500 J 5,100 J thalene 28,000 2,500 J 2,500 J xyl) 2,103 J 2,200 J 27,000 J xyl) 2,103 J 16,000 J 16,000 J m 0.11 Z,600 J 110 J 4.1 I,700 J 330 J 4,809 J 31.36 J														
Oxide 31 113 <td></td> <td></td> <td></td> <td></td> <td>,</td> <td>VOC</td> <td>s, µg/kg</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>					,	VOC	s, µg/kg							
onide 13 23 113 113 SVOCs, µg/kg thalene 28,000 2,200 2,500 2,500 2,500 1 tyl) 2103 2,200 27,000 2,500 1 1 tyl) 2103 2,200 27,000 27,000 1 1 tyl) 2103 2,200 27,000 27,000 1 1 tyl) 22,00 27,000 27,000 27,000 27,000 1 tyl) 14,000 920 16,000 1 1 tyl) 14,000 920 16,000 1 1 tyl) 12,000 920 16,000 1 1 tyl) 12,000 110 4.1 1,700 330 4,809 91.36 0.07 J	Tetrachloroethylene		3.5				100							
onide 13 2 3 2 200 1 5,100 1 2,500 1 5,100 1 2,500 1 </td <td>2-Butanone</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>11.3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	2-Butanone							11.3						
13 SVOCs, µg/kg 2,200 J 5,100 J S,100	Chloroform				2.5								=	23
13 SVOCs, µg/kg 25,000 27,000	Methylene chloride								2,200,1	5.100 J				
Ayl) SVOCs, µg/kg 2,206 27,000 27,000 Ayl) 210 J 14,000 16,000 16,000 Im 0.11 2,600 110 4.1 1,700 0.075 330 4,809 91.36 0.07 J	Xylenes		13		~~					2.500 J				2.5
thalene 28,000 27,000 2						SVO	Cs, µg/kg							
xyl) 210 J 920 J 16,000 14,000 120 J TPH, mg/kg m 0.11 2,600 110 4.1 1,700 0.075 330 4,809 91.36 0.07 J	2-Methylnaphthalene		28,000						2,200	27.000				
210 J 14,000 920 J 16,000 14,000 15,	bis(2-Ethylhexyl)												2101	1001
14,000 920 J 16,000 100 14,000 110 100 100 100 100 100 100 100 100	phthalate													
m 0.11 2.600 110 4.1 1.700 0.075 330 4.809 91.36	Dibenzofuran		2103											
m 0.11 2.600 110 4.1 1.700 0.075 330 4.809 91.36	Naphthalene		14,000						920 J	16.000				
m 0.11 2.600 110 4.1 1.700 0.075 330 4.809 91.36	Acenaphthene		210.3											
m 0.11 2,600 110 4.1 1,700 0.075 330 4,809 91.36						TPH	me/kg		1					
	Total Petroleum	0.11	2,600	011		4.1	1.700	0.075	330	A ROO	91 16	1 200		
	Hydrocarbons)	3	<u> </u>	200	·		

Soil samples collected in December, 1992

Blank space indicates compound was not detected.

D = indicate duplicate sample

J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.

µg/kg = micrograms per kilograms

ng/kg = milligrams per kilograms

Source: ORNL/ETS SI Report (1994)

TABLE 2-9

Organic Compounds Detected in Site 14 - OWS Ground Water 152nd Tactical Reconnai: ~e Group, NVANG, Reno, Nevada

			حساسات بالإسلامات	
Ch amical	MW18	141 VV 18	MW15	MW15
Chemical	1.2/3/92	3/4/92	12/3/92	3/4/92

 VOCs, μg/l

 Carbon disulfide
 2.0

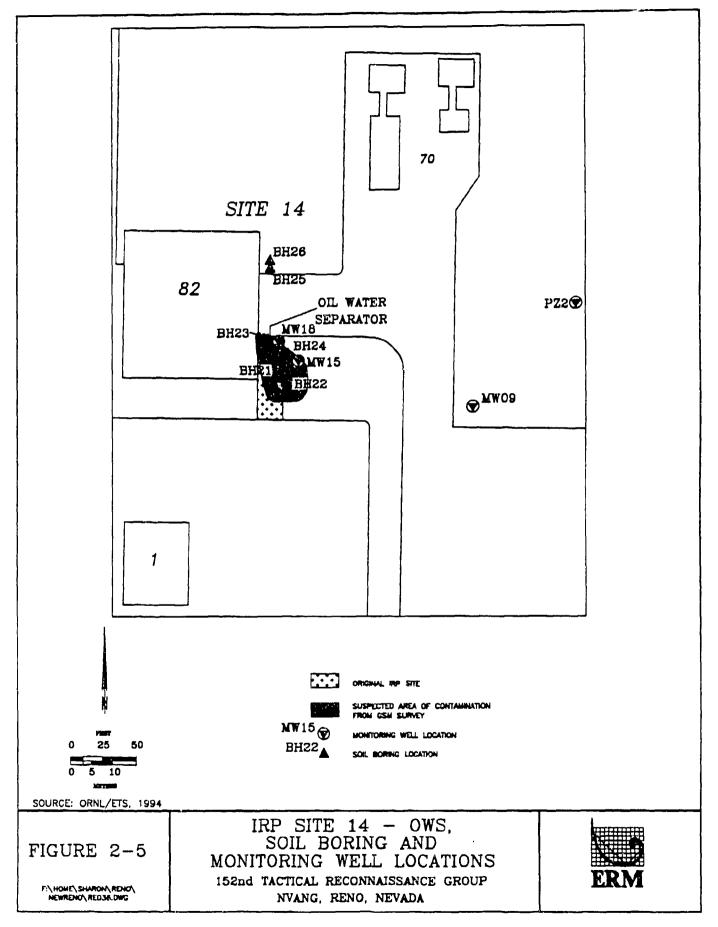
 SVOCs, μg/l
 1.0

 Butylbenzyl phthalate
 1.0

 Di-n-butyl phthalate
 1.0

Blank space indicates compound was not detected $\mu g/l = micrograms$ per liter

Source: ORNL/ETS SI Report (1994)



ENVIRONMENTAL SETTING

The environmental setting at the NVANG Base is presented here to establish a reference for describing sitewide work performed during the RI.

3.1 Topography

The average elevation of the Base is 4,400 feet above mean sea level. The area around Truckee Meadows is generally flat with a gentle slope to the west, although topographic relief is substantial in the surrounding mountain ranges (ASG, 1989).

3.2 Meteorology

The annual mean temperature for Reno, Nevada, is 49.9°F with a maximum monthly average of 91.3°F occurring in July and a minimum monthly average of 18.9°F occurring in December. The average daily temperature change is 35°F with a maximum daily temperature change of 43.5°F occurring in July and August (ASG, 1989).

National Oceanic and Atmospheric Administration Station No. 26-6779, located at Reno Cannon International Airport, records an average annual precipitation of 7.49 inches for the Reno, Nevada, area. According to the Water Atlas of the United States, Plate 12, the average annual evaporation from open water surfaces is 43 inches (ASG, 1989). Using the method outlined in the Federal Register (47 FR 31224, July 1982), the annual net precipitation for the Base is -35.51 inches (ASG, 1989). Rainfall intensity based on the 1-year, maximum 24-hour rainfall is calculated to be 1.5 inches (ASG, 1989).

3.3 Geology

The majority of the information presented in the following sections was obtained from Cohen and Loeltz (1964), Bingler (1975), and the PA (ASG, 1989), which contains information derived from the Nevada

Bureau of Mines and Geology Report #25 (Bateman and Sheibach, 1975).

Geologic maps of the Reno and Mt. Rose quadrangles show that the northern portion of the Base lies on a Quaternary deposit termed "floodplain and lacustrine deposits" consisting of interbedded gray to pale grayish-yellow silt and fine-grained sand with thin lenses of peat. These are fluvial and lacustrine deposits up to 23 feet thick with little or no soil development (Bonham and Rogers, 1983). The southern portion of the air-field is underlain by deposits known as "alluvial Bajada deposits" consisting of thin, sheet-like aprons of fine- to medium-grained sand with intercalated muddy, medium-pebble gravel. These deposits result from low gradient streams that have reworked older gravelly outwash and alluvial fan deposits. They are weakly weathered and largely undissected, with little or no soil development (Bonham and Rogers, 1983).

The general geology of the Reno area, shown in Figure 3-1, consists of a north-trending basin known as the Truckee Meadows. This basin is located at the western margin of the Basin and Range physiographic province just east of the Sierra Nevada. Bingler (1975) describes the Truckee Meadows as a structural depression bounded on the west by the Carson Range, the Virginia Range on the east, Steamboat Hills to the south, and the eastern part of the Peavine Mountain block to the north. These marginal blocks consist of Mesozoic metavolcanic and plutonic rocks overlain by a thick sequence of Tertiary volcanic and epiclastic rocks. The Tertiary rocks are predominantly andesite and andesite porphyry flow rock, hypabyssal intrusives, and minor siliceous welded tuff, which are commonly represented by the Kate Peak and Alta Formations.

The foothill and mountain drainages that rim the basin contain large exposures of altered volcanic rock. Along the western margin of the basin and to the north and west along the Truckee River drainage basin, tilted beds of Miocene to upper Pliocene Hunter Creek Sandstone (composed of conglomerate, sandstone, and diatomite) are exposed, marking the start of early basin-sediment accumulation. The continuation of long-established patterns of basin-sediment accumulation is represented by the extensive Quaternary deposits exposed in the Truckee Meadows. A generalized stratigraphic column of the Truckee Meadows and surrounding area is presented in Figure 3-1.

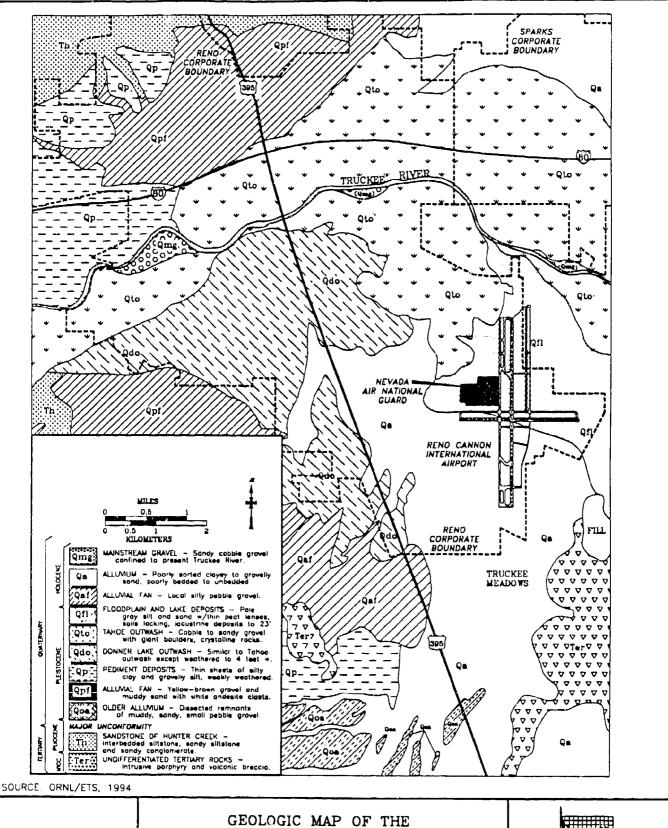


FIGURE 3-1

F:\HOME\SHARON\RENO\ NEWRENO\RE002.DWG GEOLOGIC MAP OF THE RENO, NEVADA AREA

152nd TACTICAL RECONNAISSANCE GROUP NVANG, RENO, NEVADA



Bingler (1975) divided the Quaternary deposits into three major categories:

- Main stream gravel deposits of the Truckee River represented by bouldery outwash from glacial activity;
- A long and complex history of alluvial fan deposition along the margins of the Truckee Meadows that extends in time from the Pleistocene into the Holocene; and
- Reworked older deposits and deposition of fine-grained clastic debris throughout the central part of the Truckee Meadows by low gradient streams during the Holocene and continuing to the present.

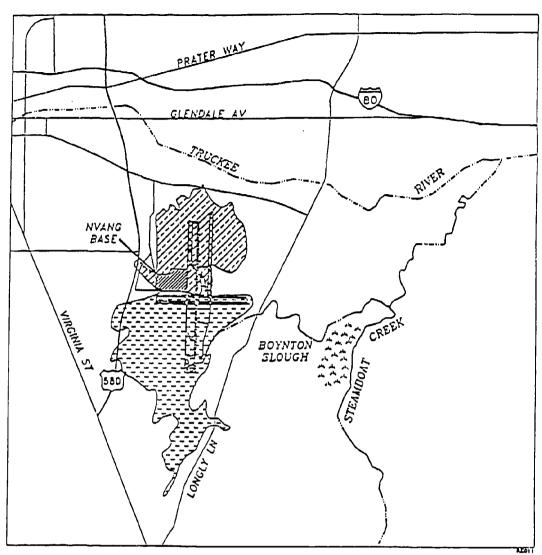
Geothermal activity in Truckee Meadows is found in two major areas known as Steamboat Springs and Moana. These activities are theorized to be due to the cooling of an intrusive body at a depth that may be connected to ground water resources throughout fault systems near these areas. Geothermal activity has a profound effect on ground water chemistry by means of hydrothermal alteration of volcanic rocks underlying Truckee Meadows.

3.4 Soils

The locations of the two general soil types found at the NVANG Base are shown in Figure 3-2. The soil descriptions below are based on the ASG PA (ASG, 1989) and were derived from the Soil Survey of Washoe County, Nevada, South Part (Baumer, 1983).

The Truckee sandy loam, gravelly substratum covers the northern half of the airport and all of the Base property (Baumer 1983, Map Index No. 805). This very deep, somewhat poorly drained soil is on flood plains and is formed in alluvium derived from mixed rock sources. Typically, the surface layer is gray sandy loam about 12 inches thick. The upper 18 inches of the underlying material is gray, stratified sandy loam through silty clay loam. The lower part, to a depth of 60 inches, is a pale-brown, stratified, gravelly sand through very gravelly sandy loam. Depth to the gravelly material ranges from 30 to 40 inches. Permeability of the Truckee soil is moderately slow in the upper part of the underlying material and rapid in the lower part.

The Vamp silt loam, strongly saline-alkali, covers the southern half of the airport and adjacent areas (Baumer, 1983, Map Index No. 911). This



ZZ2

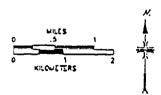
TRUCKEE SANDY LOAM



VAMP SILT LOAM



MARSH OR WETLANDS



SOURCE: ORNL/ETS, 1994

FIGURE 3-2

F:\HOME\SHARON\RENO\ NEWRENG\FIG3-2TB.DWG GENERALIZED SOILS MAP FOR THE BASE

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is a moderately deep, somewhat poorly drained soil found on flood plains and terraces. The soil is formed in alluvium and is derived from mixed rock sources. Typically, the surface layer is grayish-brown silt loam about 3 inches thick. Below this is a layer of light grayish-brown and pale-brown, stratified, fine sandy loam and loam about 33 inches thick. The next layer is white, strongly-cemented hardpan about 6 inches thick, which is underlain to a depth of 60 inches by yellowish-brown and light olive-gray, stratified loam, sandy loam, and loamy sand. Depth to the hardpan ranges from 20 to 40 inches. Permeability of the Vamp soil is moderate. A seasonal high water table is at a depth of 30 to 40 inches in spring and early summer.

Channeling and deposition are common along stream banks in both soil units. The risk of corrosion is high for uncoated steel and concrete structures because both soil units are strongly saline and alkaline-affected. Both soil units are subject to seasonal flooding that has been controlled around the Base by deepened drainage ditches.

3.5 Hydrology

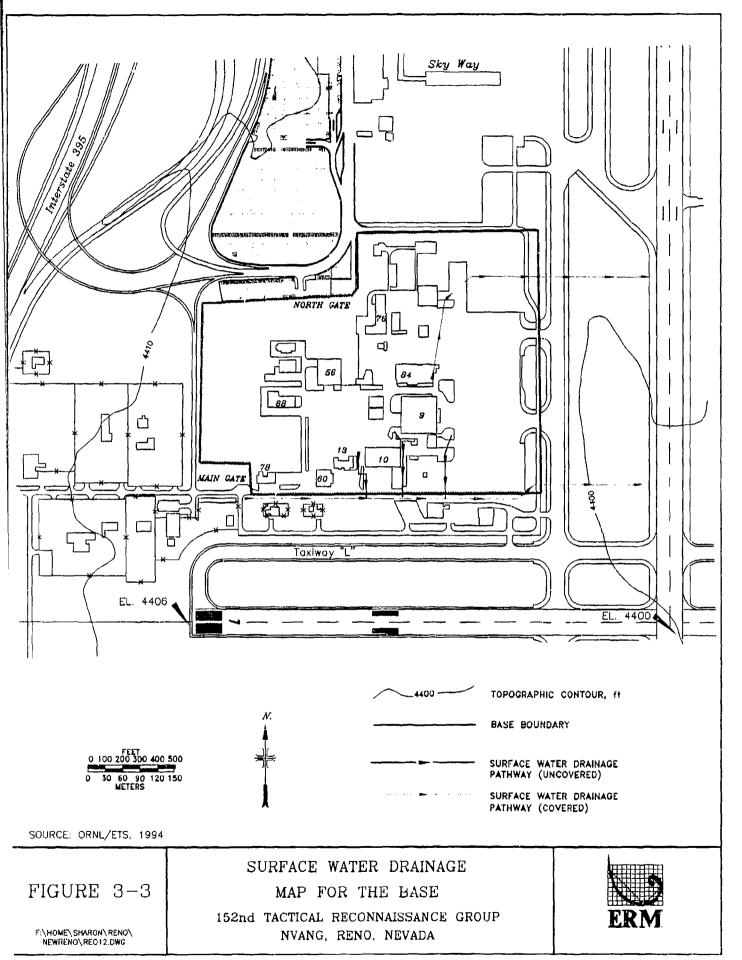
The following subsections describe the surface water hydrogeology and the hydrogeology of the NVANG Base.

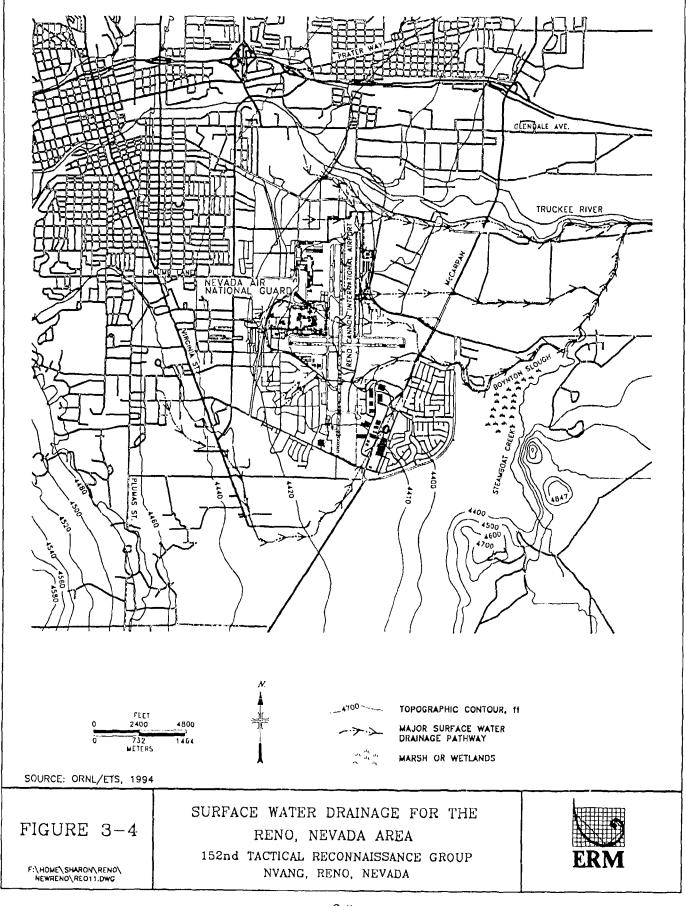
3.5.1 Surface Water Hydrology

Surface water in the vicinity of the Base occurs in both open and covered drainage ditches. Irrigation ditches fed by diversion dams on the Truckee River pass by the Base just east of the airfield. There are drainage ditches along the north and south sides of the Base (Figure 3-3) that conduct water to the east, across the airfield, and into Boynton Slough, which drains into Steamboat Creek (ASG, 1989).

The Truckee Meadows is drained by the Truckee River, which flows from west to east through the meadows (Figure 3-4). The Base lies 1.5 miles south of the river channel at its closest point. Steamboat Creek, the major tributary to the Truckee River within the Meadows, enters through Pleasant Valley to the south and flows north to the Truckee River. Other streams in this area flow mainly during spring runoff (ASG, 1989).

The Truckee River supplies 85 percent (68,000 acre-feet) of the water used in the Reno-Sparks area. The remaining water demand (12,000





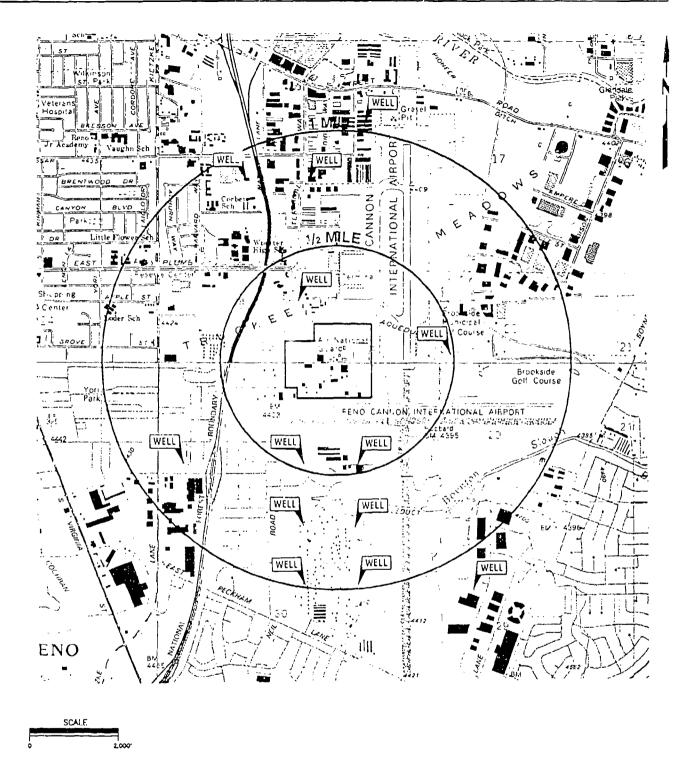
acre-feet) is supplied by several wells in the Truckee Meadows (ASG, 1989).

3.5.2 Hydrogeology

The potentiometric surface at the base can be as shallow as 3 feet below the land surface. The fine-grained nature of the upper sediments compared with the more permeable lower sediments may result in confined conditions across the Base. The proximity of the ground water surface to the land surface is due to the area's function as a ground water discharge point for the Truckee Meadows. Much of the Base and airport lie on former swampland that was filled in and drained with ditches that receive the current ground water discharge. Cohen and Loeltz (1964) estimated the total ground water discharge into the drainage ditches, drains, and sloughs east of the airport to be 6,500 acre-feet per year (acre-feet/year) with an additional 2,200 acre-feet/year discharged to drains immediately north of the airfield. Today, the only remaining swamp-land, located east of the Base, is found south of the confluence of Boynton Slough and Steamboat Creek.

Ground water in the Truckee Meadows occurs under both artesian and water table conditions in the unconsolidated and partially consolidated younger and older alluvium of the valley fill. Artesian heads in the meadows area are commonly less than 20 feet above the land surface (Cohen and Loeltz, 1964). Depths to ground water vary considerably due to the interfingering nature of the valley-fill deposits. Several public water supply wells located in the meadows are screened at depths ranging from 274 to more than 800 fc. Figure 3-5). Commonly, wells located several yards apart will tap—ater bearing deposits at different depths. This trend becomes more pronounced in the area of the Truckee River where channel shifts have left discontinuous and sinuous gravels (ASG, 1989).

Review of Nevada Department of Water Resources drilling records, stored by the United States Geological Survey Water Resources Division in Carson City, Nevada, indicate that there are 90 monitoring wells within a 1-mile radius of the NVANG. None of these wells are considered private supply wells as they are less than 30 feet deep and constructed as monitoring wells related to environmental site assessments in the airport area. Because shallow ground water in this area contains high concentrations of naturally occurring inorganic compounds, there are no known private drinking water wells near the NVANG.



SOURCE: U.S.G.S. 7 1/2' QUADRANGLE MAPS

FIGURE 3-5

VICINITY OF THE NVANG BASE

152nd TACTICAL RECONNAISSANCE GROUP

NVANG, RENO, NEVADA

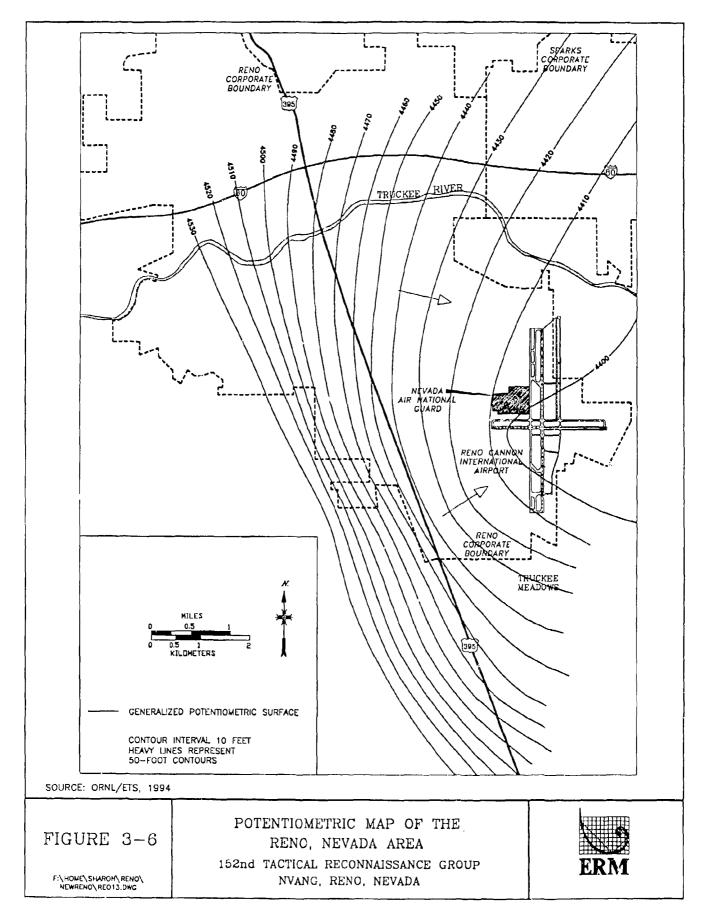
PUBLIC SUPPLY WELLS IN THE



EMP B15-5011 GN3R YTTAR 3MCH, 1

Cohen and Loeltz (1964) suggest that 70 percent of the recharge to the ground water in the Truckee Meadows is from infiltration by crop irrigation practices and 30 percent can be attributed to the infiltration of streamflow and underflow from tributary valleys. Increasing urbanization in the meadows, however, has decreased the use of crop irrigation, thus decreasing the rate of recharge and consequently lowering water levels. The state engineer's office in Carson City estimates the present annual ground water recharge to the Truckee Meadows at 20,000 to 25,000 acre-feet.

Basic ground water flow gradients and flow direction in the Truckee Meadows and vicinity of the Base are illustrated in Figure 3-6.



SECTION 4.0

FIELD PROGRAM

4.1 Summary

This section summarizes the elements of the RI field program. Deviations from the workplans and methods to handle investigation-derived waste are also presented. This section describes the activities conducted during the RI at the NVANG Base. The results of these investigations are presented and discussed in Section 5.0.

Field investigations were conducted at IRP Sites 4, 5, 7, and 14. Memoranda for field activities is included in Appendix A. Table 4-1 contains a summary of the field activities and the dates at which they were conducted. Field activities at each site consisted of the following:

- Drilling soil borings to collect soil samples for field screening and laboratory analysis;
- Installing monitoring wells to collect ground water samples for laboratory analysis; and
- Monitoring ground water, including ground water level measurement, collecting field samples for analysis of ground water field parameters (pH, conductivity, temperature), and collecting samples for laboratory analysis.
- Performing a location and elevation survey of all soil borings and monitoring wells drilled as part of the RI.

In addition to the above activities, the following activities were conducted at IRP Site 7 - POL Storage Area as part of product removal activities:

- Surface geophysical survey using a magnetometer and ground penetrating radar to locate the surface extent of four USTs and associated piping at IRP Site 7 - POL Storage Area, and the extent of the excavated area around the tanks;
- Installation of floating product thickness monitoring and floating product recovery wells; and

TABLE 4-1

Summary of Remedial Investigation Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Date(s)	Installation Restoration Program Site(s)	Work Performed
October 17, 1994		Remedial Investigation/Feasibility Study Kickoff Meeting held at Nevada Air National Guard Base, Reno, Nevada
April 17, 1995		Submit Final Workplan for Remedial Investigation/Feasibility Study
May 12 to 14 , 1995	4, 5, 7, 12, and 14	Perform preliminary ground water sampling round
May 15 to 18, 1995	4	Drill and sample seven borings and install two monitoring wells
May 16, 1995	7	Perform geophysical survey in vicinity of underground storage tanks
May 18, 1995	7	Install two borings to assess product thickness
May 19 to 20, 1995	7	Drill and sample eight soil borings and install one monitoring well
May 21 to 22, 1995	5	Drill and sample four soil borings and install two monitoring wells
May 22, 1995	7	Drill and sample one soil boring
May 23 to 24, 1995	7	Drill and sample four borings, install three product monitoring wells, and install one product recovery well
May 24 to 25, 1995	14	Drill and sample five soil borings
May 25 to 26, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round
July 12 to 13, 1995	4, 5, 7, 12, and 14	Resample seven monitor ับชู wells
August 21 to 25, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round
November 13 to 17, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round

- Product thickness measurement; and
- Product recovery and removal.

4.2 Deviation from the Workplan

Some deviations from ERM's RI/FS Workplan (April 1995) were necessary due to field conditions or findings during performance of the work. The deviations are listed below.

- Additional borings were drilled at the following IRP sites based on findings of field screening activities: Site 4 - Former FTA, one additional boring; Site 7 - POL Storage Area, four additional borings; and Site 14 - OWS, one additional boring.
- ERM was unable to collect soil samples from Site 14 OWS soil boring SB14-4 due to presence of a subsurface obstruction. This obstruction may have been a part of the oil/water separator at the site.
- Monitoring wells MW28 and MW29 were drilled approximately 35 feet due west of the originally planned locations at Site 4 Former FTA. This was due to the presence of subsurface utility corridor and roadway in the area where the original drilling locations were planned.
- The location of monitoring well MW30 was moved approximately 20 feet north of the originally planned location to the presence of an addition to Building 76.
- One additional monitoring well (MW32) was added at Site 5 Former FTA. The purpose of the monitoring well MW32 was to replace monitoring well MW19, a destroyed monitoring well that was formerly located upgradient of Site 5.
- One additional product monitoring well (T-3) was added at Site 7 -POL Storage Area. This monitoring well was installed at the same location as soil boring SB7-5 based on the discovery of free product during drilling.
- Monitoring wells MW04 and MW05 were not sampled during the pre-drilling sampling round (prior to the start of drilling activities) because the wells could not be located based on surface inspection

alone. ERM utilized a metal detector to locate the wells and they were sampled at the same time as the initial sampling round for RI monitoring wells.

- Monitoring well MW24 also could not be sampled during the predrilling sampling round due to the presence of an obstruction in the casing. The obstruction was cleared and the well was sampled at the same time as the initial sampling round for RI monitoring wells.
- The analytical laboratory experienced quality control problems during VOC analysis of ground water samples collected during the initial sampling round for new monitoring wells. ERM resampled these monitoring wells in July 1995, with the exception of monitoring well MW31. This monitoring well was inadvertently not resampled.

4.3 Field Screening Activities

The following sections describe field screening activities conducted during the RI, including a surface geophysical survey using a magnetometer and ground penetrating radar, and field screening of soil samples using a portable field gas chromatograph (GC).

4.3.1 Geophysics

Spectrum E.S.I. of San Fernando, California, performed a geophysical survey of the immediate vicinity of the four USTs located at Site 7 - POL Storage Area. The purpose of the survey was to locate the above ground extent of the gravel backfill within the excavation in which the USTs were located. The survey was performed using ground penetrating radar and magnetometer methods.

4.3.2 Field Gas Chromatograph (GC)

4.3.2.1 Methods. A Photovac Model 10S Plus portable GC was used to screen soil and ground water samples prior to shipment to the laboratory for analysis. Table 4-2 provides a summary of samples analyzed using the field GC.

Three soil samples from each borehole with the highest VOC concentrations as determined by the field GC were sent to the laboratory for analysis. The portable GC included a photoionization detector (PID) with 10.6 electron volt electrodeless discharge tube. The carrier gas used was ultra-pure, zero grade air.

TABLE 4-2

Summary of Soil Samples Collected for Chemical Analysis 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

					AmnN	Number of Quality Assurance/Quality Control Samples	urance/Quality C	ontrol Samples		
Installation Restoration Program Site	Boring Identifiers	Lab Analyses (EPA Method)	Original Samples	Trip Blanks	Equipment Blanks	Field Blanks	Field Duplicates	MS/MSD	Designated for Data Validation	Tota!*
Site 4	SB4-1 through SB4-7	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	21	2	1	1	2	-		23
		Field GC	30							30
Site 5	SB5-1 through SB5-4	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	10	1		parel	1	part		11
		Field GC	13				1			14
Site 7	SB7-1 through SB7-12	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	35	3	2	2	is.	ε	7	0†
		Field GC	44				+			48
Site 14	SB14-1 through SB14-5	SB14-1 through (8270), TPH (8015 Modified)	80	1	1	-	1			6
		Field GC	12							12

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds TPH = total petroleum hydrocarbons

MS/MSD = matrix spike/matrix spike duplicate

EPA = Environmental Protection Agency = blank samples, MS/MSD samples, and samples designated for data validation not included in total GC = gas chromatograph

Initially the field GC was calibrated by injecting three different standards. The standards were prepared using a mixture of commercially available BTEX (benzene, toluene, ethylbenzene, m-xylene, p-xylene, and o-xylene), TCE and tetrachloroethylene (PCE) solutions in methanol and American Standards for Testing and Materials (ASTM) Type I water. Three standards were prepared each day: 10, 50, and 500 μ g/l BTEX, TCE, and PCE standards, respectively. The standard solutions were prepared in 40-milliliter glass vials with septa. Approximately 20 milliliters of each standard solution were prepared. The standard solutions were shaken vigorously for more than 1 minute to ensure that the VOCs could partition into the headspace of the vials. A syringe was used to collect a headspace sample through the septum and to inject the headspace sample into the field GC.

After the initial calibration, new standards were prepared each day. Routine startup procedures included running machine blanks using zero air, syringe blanks, method blanks, and the three standards.

Chromatographs generated for the sample were compared to chromatographs generated for the standards that bracketed the run. VOCs were identified by comparing the relative retention times of compounds detected in the sample with those detected in the standards. The response areas of each detected compound in the sample were compared to those of the standards to calculate the concentrations of each VOC in the sample.

In a large number of samples, compound identification and compound concentration calculation relative to the standards were uncertain. This was due to the presence of a large number of unidentified compounds in the samples. Using the chromatographs, samples that did not contain any or very low concentrations of VOCs could be differentiated from samples that contained moderate and high concentrations of VOCs. For compounds with moderate and high concentrations, the individual compounds and their concentrations could not be determined with any level of certainty. chromatographs and the general area of the response were used as a relative measure of the concentration of VOCs in the samples and as the criteria for sample selection for laboratory analysis. The field GC results recorded on the boring logs included in Appendix D reflect the totals of compounds (BTEX, TCE, and PCE) detected in each sample. These numbers were used as a general indication of the volatile compound content of the samples. Field notes for field GC operations and chromatographs for each day of GC operation are included in Appendix B.

4.3.2.2 Soil Sample Analysis. Soil samples collected in brass sleeves were stored in an ice chest prior to analysis. Approximately 10 grams of soil were transferred into a 40-milliliter glass vial with a septum containing approximately 15 milliliters of ASTM Type I water. The field GC operator verified that headspace volume in the sample vials was similar to headspace in the vials containing the standards. The weight of the soil in the vial was recorded in the field notebook. The sample was labeled and shaken vigorously for more that 2 minutes to ensure that the VOCs in the soil and water solution could partition into the headspace of the vial. A syringe was used to collect the headspace sample through the septum and to inject it into the field GC. The volume of the injected headspace sample ranged from 5 to 100 microliters (µl) depending on the expected volatile concentration in the sample based on PID screening and prior knowledge of the site.

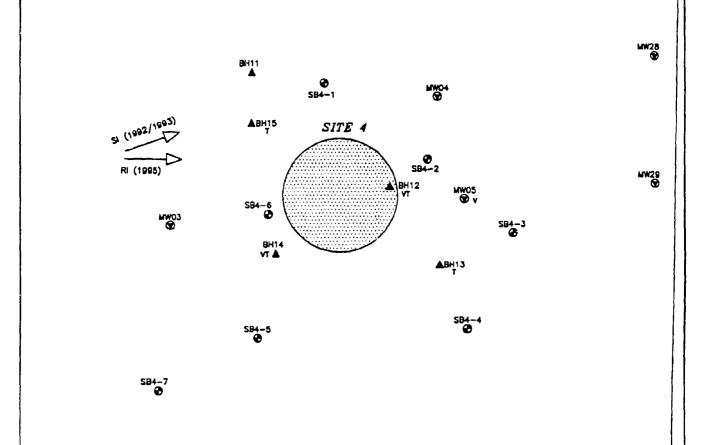
4.3.2.3 Ground Water Selected Sample Analysis. Ground water samples were also analyzed using the field GC. The samples were collected in 40-milliliter glass vials with septa and were stored in an ice chest. Prior to field GC analysis, approximately 20 milliliters of the ground water sample was transferred into a labeled 40-milliliter glass vial with septum. The field GC operator verified that the headspace volume in the sample vial was similar to the headspace in the vials containing the standards. The sample vial was then shaken vigorously for more than 1 minute to ensure that the VOCs in the ground water could partition into the headspace of the vial. A syringe was used to collect the headspace sample through the septum and to inject it into the field GC. The volume of the injected headspace sample ranged from 50 to 200 μl depending on the expected volatile concentration in the sample based on prior knowledge of the site.

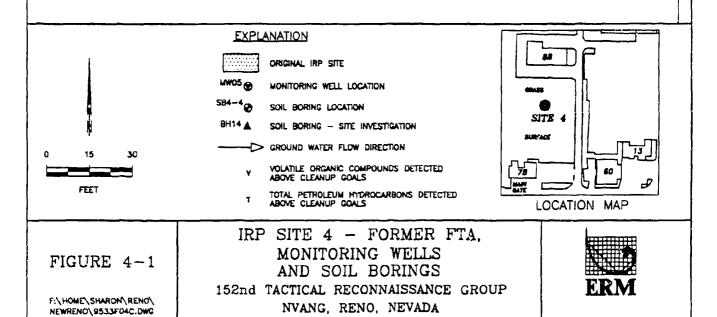
4.4 Confirmation Activities

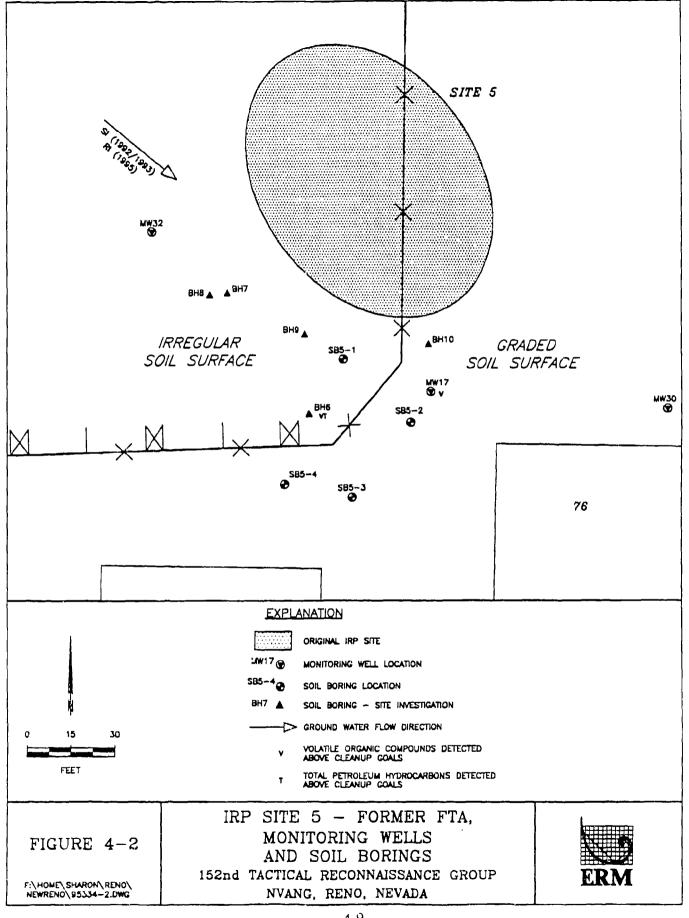
The following sections describe soil boring, soil sampling, well installation, and ground water sampling activities conducted during the RI.

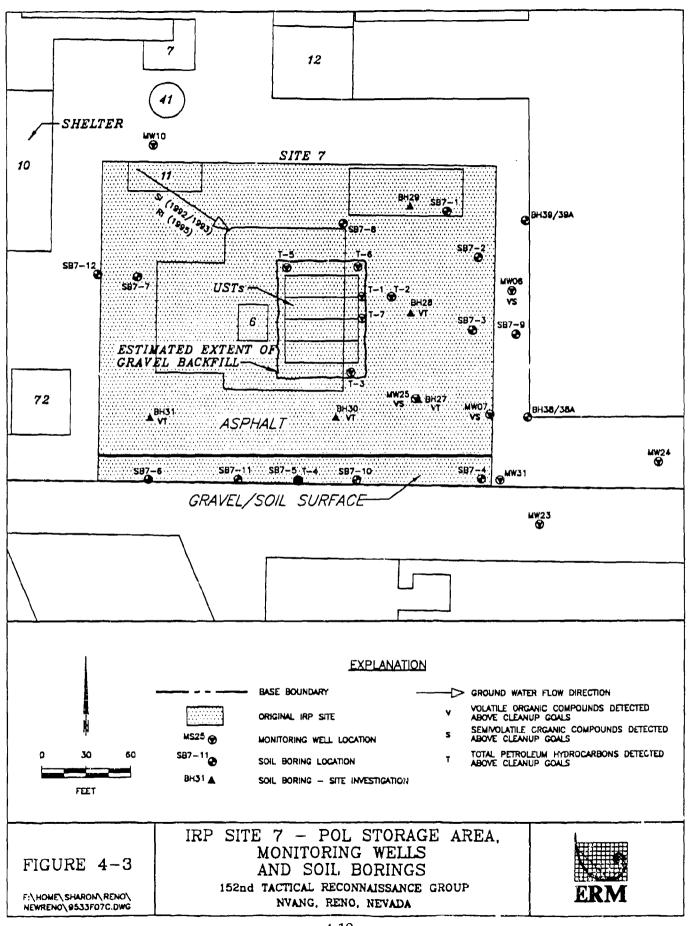
4.4.1 Soil Borings

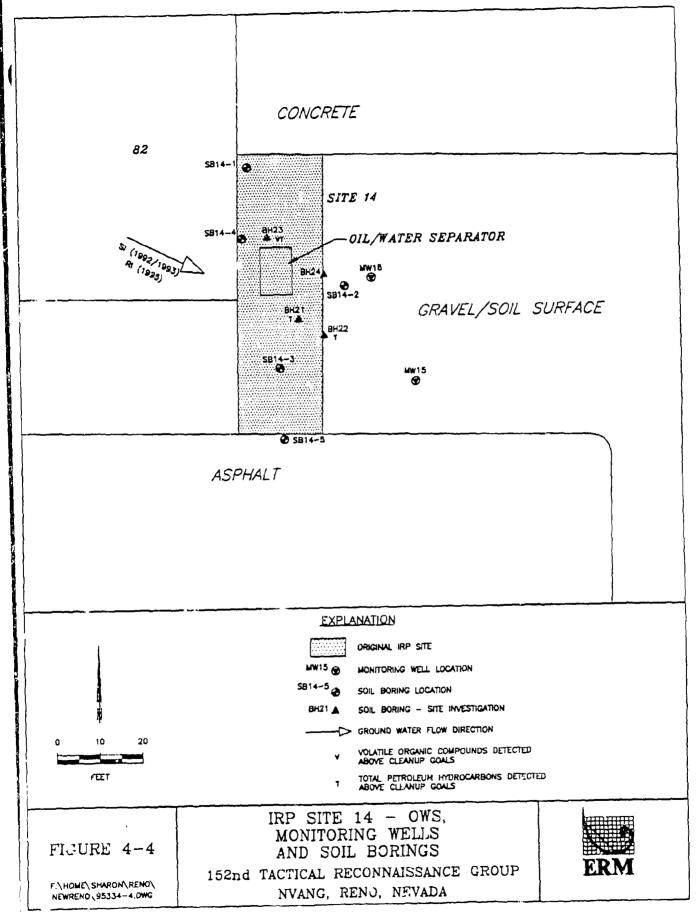
Soil borings were drilled to collect soil samples for confirmation analysis for each site under investigation. Soil samples were collected and analyzed to determine the lateral and vertical extent of soil contamination at each site. Table 4-2 provides a summary of soil samples collected for chemical analysis. Soil borings drilled during RI activities are shown on Figures 4-1 through 4-4.











Soil borings were drilled using the hollow-stem auger method, and continuous drive samples were collected using a 2-foot-long stainless steel split-spoon drive sampler equipped with four 6-inch-long brass sleeves. Soil borings were terminated at the top of the water table at investigation sites where unconfined or water table conditions occurred, or at the bottom of the confining layer at investigation sites where confined conditions occurred. All soil samples were collected in the unsaturated zone.

Soil samples in each drive sampler were field screened using a PID. The ends of the two bottom-most brass sleeves were then covered with Teflon and fitted with a plastic cap. The bottom-most brass sleeve was stored in an ice chest for potential shipment to the laboratory for analysis. The second sleeve from the bottom was field screened using a field GC.

Field screening results were used to determine the samples to be sent for laboratory analysis. In general, three samples from each soil boring were submitted for laboratory analysis. If the results of the field screening did not clearly target a specific interval for laboratory analysis, samples collected from immediately below the surface fill material, from the middle of the borehole, and from the bottom of the borehole were submitted for laboratory analysis.

The third brass sleeve from the bottom of the sampler was used for lithologic logging, and the uppermost brass sleeve was discarded due to the potential presence of slough material. Lithologic logs are included in Appendix C.

4.4.2 Well Installation

Ground water monitoring wells installed during the RI field activities were for the purpose of defining the lateral extent of ground water contamination at the IRP sites. A summary of well construction details is provided in Table 4-3. A total of five ground water monitoring wells, three product thickness monitoring wells, and one product recovery well were installed (Figures 4-1 through 4-4). All wells were drilled using the hollow-stem auger drilling method. With the exception of the product recovery well T-3, 8-inch outer diameter (OD) hollow-stem augers were used for drilling. Fifteen-inch OD hollow-stem augers were used to drill the product recovery wells.

Threaded, flush-joint, 2-inch schedule 40 PVC casing and screen were used for the construction of the monitoring wells. Threaded, flush-joint, 6-inch schedule 80 PVC casing and screen were used for the

Monitoring Well Installation Summary 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	IRP Site No.	Date Completed	Measuring Point Elevation, ft msl	Total Derrih of Borehole, ft bgs	Screened Interval, it bgs	Top of Filter Pack, ft bgs	Depth	Depth to Water, ft bmp (date)	Water Level Elevation, frmsl	Product Thickness, feet (date)
MW02	Background	11/12/92	4404.62	20.5	71017	5.0	4.72	(5/12/95)	4399.90	
MW03	-	11/13/92	4404.38	18.5	6 to 16	£.0	6.72	(5/14/95)	4397.66	
MW04	4	11/13/92	4403.69	18.0	6 to 16	4.5	5.83	(5/25/95)	4397.86	
MW05	+	11/13/92	4403.61	13.0	6 to 11	4.5	5.65	(5/24/95)	4397.96	
MW06	7	11/14/92	4398.69	16.0	4.5 to 14.5	2.5	4	(5/13/95)	4394.25	
MW07	7	11/14/92	4397.90	14.5	4 to 14	3.0	3.94	(5/13/95)	4393.96	Trace (5/13/95)
MW08	7	11/15/92	4399.21	16.0	4 to 14	3.0	4.78	(5/13/95)	4394.43	
MW09	2	11/15/92	4401.97	16.0	41014	3.0	6.12	(5/15/95)	4395.85	
MW10	7	11/16/92	4400.79	16.0	3 to 13	2.5	5.38	(5/14/95)	4395.41	
MWII	2	11/16/92	4400.09	16.0	4 to 14	3.0	4.98	(5/12/95)	4395.11	
MW12	13	11/17/92	4402.50	18.5	6 to 16	0.4	5.97	(5/12/95)	4396.53	
MWI3	13	11/17/92	4402.48	18.0	6 to 16	6.0	5.84	(5/15/95)	1396.64	
MW14	13	11/17/92	4402.13	16.0	5.5 to 15.5	4.0	5.66	(5/15/95)	4396.47	
MW15	=	11/18/92	4402.77	14.5	3.5 to 13.5	3.0	6.72	(5/17/95)	4396.05	
MW17	5	11/18/92	4402.50	15.0	4 to 14	3.0	5.87	(5/12/95)	4396.63	
MW18	Ξ	11/19/92	4402.57	16.5	4.5 to 14.5	3.0	6.47	(5/17/95)	4396.10	
M(W23	1	12/1/92	4399.40	18.0	5 to 15	3.0	5.67	(5/14/95)	4393.73	
MW24	7	12/2/92	4398.67	16.0	5 to 15	3.0	4.75	(5/25/95)	4393.92	
MW25	7	12/5/92	4397.78	14.5	3 to 13	1.5	3.90	(5/13/95)	4393.88	Trace (5./13/95)
M:W26	21	11/3/93	4397.63	15.0	5 to 15	3.0	19.4	(5/12/95)	4392.99	
MW27	12	11/2/93	4397.32	15.0	5 to 15	3.0	322	(5/13/95)	4394.10	
MW28	-	5/18/95	4404.03	18.5	8 to 18	5.0	6.48	(5/54/65)	4397.55	
MW29	-	5/18/95	4404.05	18.5	8 to 18	5.0	6.30	(4/24/93)	4397.75	
WW30	2	\$/22/95	4404.48	19.0	8 to 18	5.0	7.27	(5/22/95)	4397.21	
MW31	7	5/20/95	4398.51	19.0	8 to 18	5.0	439	(5/22/95)	4394.12	
MW32	20	5/24/95	4401.89	19.0	8 to 18	5.0	89:	(5/24/95)	4397.21	
1:1	-	5/13/95	4399.50	11.0	3 to 11	2.0	A'A	A Z	ΝΑ	5.51 (5/19/95)
T-2	-	5/23/95	4399.29	14.0	3 to 13	2.0	NA	Α'n	¥Z	0.10 (5/19/95)
7:3	7	5/23/95	4399.00	15.5	4 to 14	3.0	¥	A'A	Y.Y	5.68 (5/26/95)
14	7	5/74/95	4398.32	19.0	8 to 18	5.0	NA	NA A	NA	0.07 (5/26/95)

ft msl = feet above mean sea level ft bgs = feet below ground surface ft bmp = feet below measuring point = = minimum product thickness; product-water interface not encountered NA = not available

product recovery well. PVC well caps of the same diameter were used to cap the casing. The screen consisted of threaded, flush-joint pipe with 0.010-inch slot size.

The annular space between the well screen and the borehole wall was backfilled with clean, well-graded, silica sand. The silica sand was installed to 1 to 3 feet above the screened interval. A 1.5- to 3-foot bentonite slurry seal was installed above the sand pack. The remainder of the annular space to approximately 1 foot below ground surface was filled with bentonite-cement grout. All annular material was added through the augers. The PVC risers were sealed with expanding lockable plugs and finished with 8-inch ID protective steel casing with removable steel covers. The well covers were flush mounted with the ground surface and reinforced with a concrete apron. A typical construction diagram for monitoring wells installed during the RI is shown on Figure 4-5. Monitoring and product recovery well construction diagrams are included in Appendix D. Well logs are included in Appendix C.

At least 24 hours after well completion, ground water monitoring wells were developed using a 2-inch submersible pump. Ground water levels were monitored prior to the start of well development. An electric water level meter accurate to 0.01 feet was used for ground water level measurement from a marked point on the top of the well casing. Temperature, specific conductivity, and pH were monitored and recorded during well development. Approximately ten well volumes were purged until the clarity of the water had stabilized and until the temperature, specific conductivity, and pH had stabilized. If any potable water was added to the well during construction, it was ensured that at least three times the water added was removed during purging.

Product thicknesses were measured in monitoring wells using an interface probe either immediately prior to ground water sample collection (MW-series monitoring wells) or approximately 3 days after completion (T-series monitoring wells).

4.4.3 Ground Water Sampling

Ground water samples were collected from all ground water monitoring wells installed during the RI and from selected existing monitoring wells. Table 4-3 provides construction details for monitoring wells sampled during RI activities. Table 4-4 provides a summary of ground water samples collected for chemical analysis. Prior to sampling, at least three well volumes were evacuated using a

TABLE 4-4

Summary of Ground Water Samples Collected for Chemical Analysis 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

					Number	of Quality Ass	rrance/Qualit	Number of Quality Assurance/Quality Control Samples		
Installation Restoration Program Site	Location identifer	Lab Analyses (EPA Method)	Original Samples	Trip Blanks	Equipment Blanks	Field Blanks	Field Duplicates	MS/MSD	Designated for Data Validation	Total*
Site 4	MW03 MW04 MW05 MW29 MW29	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	ī.	-	1	-1			2	90
		Field GC	3							3
Site 5	MW17 MW30 MW32	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Laad (7421)	3	1	1			1	-	ю
		Field GC	-							1
Sue 7	MW06 MW07 MW10 MW23 MW24 MW25	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)		23	1	2	1			øc.
		Field GC	9				2			e 0
Site 14	MW15 MW18	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	2	1			ı			ю
		Field GC	2				1			3
Additional Wells	MW08 MW26 MW27	VOCs (8249), SVOCs (8270), TPH (8015 Modified), Lead (7421)	£			1		-		6
		Field GC	3							3

VOCs = volatile organic compounds SVOCs = semivolatile organic compounds TPH = total petroleum hydrocarbons

MS/MSD = matrix spike/matrix spike duplicate
EPA = Environmental Protection Agency
GC = gas chromatograph

• = blank samples, MS/MSD sample, and samples designated for data validation not included in total

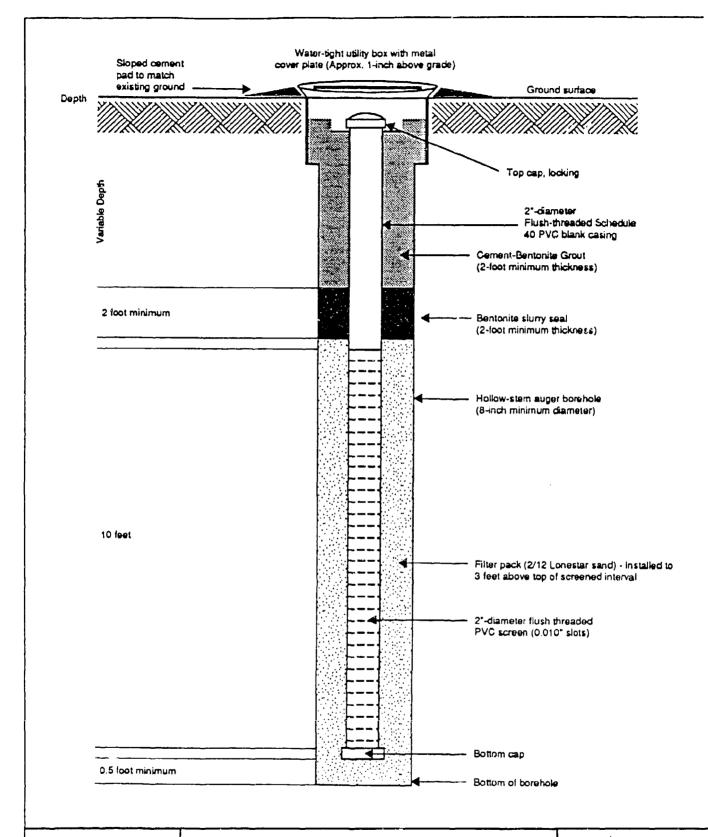


FIGURE 4-5

TYPICAL MONITORING WELL CONSTRUCTION

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA



F:\HOME\SHAROM\RENO\ HEWRENO\FIG4--5TB.DWG 2-inch submersible Rediflow 2 pump. Temperature, specific conductivity, and pH were measured and recorded during the purging process. Ground water samples were collected using disposable bailers.

Ground water samples for VOC analysis were collected in two hydrochloric acid-preserved, 40-milliliter glass vials with septa. Ground water samples for TPH, floating product, and fuel fingerprint analyses were collected in nonpreserved 40-milliliter glass vials with septa. Ground water samples for SVOC analysis were collected in two sodium-thiosulfate preserved, 1-liter amber glass bottles. Ground water samples collected for lead analysis were filtered in the field using a peristaltic pump and disposable filters. Lead samples were collected in 250-milliliter polyethylene bottles.

4.4.4 Specific Media Sampling

4.4.4.1 Subsurface Soil Sampling. Soil samples collected from soil borings drilled during the RI field work were analyzed for VOCs using EPA Method 8240, SVOCs using EPA Method 8270, and TPH using EPA Method 8015 Modified.

4.4.4.2 Ground Water Sampling. Ground water samples collected from soil borings drilled during the RI field work were analyzed for VOCs using EPA Method 8010/8020 and 8240 for confirmation of detected compounds, SVOCs using EPA Method 8270, TPH using EPA Method 8015 Modified, and lead using EPA Method 7420.

<u>4.4.4.3 Product Sampling.</u> Fuel hydrocarbon samples collected from product monitoring wells were analyzed for fuel fingerprint using EPA Method 3510/8000.

4.4.5 Field Quality Assurance/Quality Control (QA/QC)

The following subsections describe the quality assurance/quality control (QA/QC) procedures employed during RI field activities at the NVANG Base.

4.4.5.1 Field Procedure Documentation. Daily log books were kept documenting field activities and field GC operation. Ground water monitoring information was recorded on ground water monitoring forms, and well development information was recorded on well development forms. The ground water monitoring and well development forms were kept in a bound notebook.

4.4.5.2 Equipment Decontamination. Before use, all soil sampling equipment that would directly contact the samples was scrubbed with a solution of tap water and Alconox, and rinsed with tap water, pesticide grade methanol, and ASTM Type I water. The submersible pump used for purging the monitoring wells was decontaminated by pumping Alconox solution followed by tap water through the pump and tubing. The auger flights were decontaminated before each use by steam cleaning.

4.4.5.3 Field OA/OC Samples. Field duplicate samples and field and trip blanks were submitted to the analytical laboratory to provide the means to assess the quality of the data resulting from the field sampling program. Field blanks were collected at the frequency of one every two days, and trip blanks were collected at the frequency of one per cooler per day. Field and trip blank samples were analyzed to check for contamination associated with sampling procedures and/or ambient conditions at the site. Duplicate samples were collected at the frequency of 10 percent of the original number of samples. Equipment blanks were prepared at the frequency of one every two days to determine the adequacy of the equipment decontamination procedures. QA/QC samples were submitted using nonindicative sample identifiers to provide a QA check on analytical procedures and results.

Matrix spike samples provide information about the effect of the sample matrix on the analytical methodology. Matrix spike analyses were performed within the analytical laboratory. All matrix spikes were performed in duplicate. One matrix spike/matrix spike duplicate was designated for every 20 samples per sample matrix (ground water and soil).

QC for field measurements (pH and specific conductance) consisted of a premeasurement calibration and a postmeasurement verification using standard reference solutions, in accordance with the manufacturer's recommendations. These procedures were performed at least once per day.

Holding times for water and soil samples are summarized in Table 4-5. Holding times are defined as the maximum length of time that samples may be held before the completion of analytical protocols. All samples were chilled in a temperature range between 2° and 4°C and were maintained at that temperature through transport and subsequent storage at the analytical laboratory.

4.4.5.4 Ground Water Sample Preservation. Samples collected for VOC analysis were preserved with no more than two drops of a 1:1 solution of hydrochloric acid per 40-milliliter glass VOC vial. The vial had

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TABLE 4-5

Summary of Holding Times for Water and Soil Samples
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Parameter	Holding Time
	Water Samples
Volatile Organic Compounds	Analyze within 14 days of collection.
Lead	Analyze within 6 months of collection.
Total Petroleum Hydrocarbons	Extract within 14 days of collection and analyze within 40 days of extraction.
Semivolatile Organic Compounds	Extract within 14 days of collection and analyze within 40 days of extraction.
	Soil Samples
Volatile Organic Compounds	Analyze within 14 days of collection.
Total Petroleum Hydrocarbons	Extract within 7 days of collection and analyze within 40 days of extraction.
Semivolatile Organic Compounds	Extract within 14 days of collection and analyze within 40 days of extraction.

Tcflon-lined septa within the lid. Samples collected for TPH analysis were collected in 40-milliliter glass vials with Teflon septa. Samples collected for SVOC analysis were stored in a 1-liter amber glass bottle with a Teflon-lined lid. Samples collected for lead analysis were preserved in a 200-milliliter polyethylene container. All ground water samples were stored in ice chests with enough ice to maintain samples at a temperature less than 4°C.

4.4.5.5 Soil Sample Preservation. All soil samples submitted for laboratory analysis were contained in brass sleeves. Immediately upon removal from the split-spoon sampler, the ends of the filled brass sleeves were covered first with Teflon (a moisture barrier) and then with a fitted plastic cap. Samples were then placed in individual Gladlock bags and stored in an ice chest with enough ice to maintain samples at a temperature of less than 4° C.

4.5 Location and Elevation Survey

The second secon

Locatic. and elevation surveys at the NVANG were performed by Pyramid Engineers & Land Surveyors, Inc., of Reno, Nevada. The locations of RI wells and soil borings were tied into the state plane coordinate system using control points previously surveyed during the SI. The elevations of soil borings and monitoring wells were also tied into control points previously surveyed during the SI. Appendix D contains coordinates and elevations of soil borings and monitoring wells surveyed during the RI.

4.6 Investigation Derived Wastes

Wastes generated during the RI field investigation consisted of soil cuttings from drilling activities, well equipment decontamination water, development water, and solid wastes.

Drill cuttings from each well were segregated and contained in labeled, 55-gallon steel drums at the time of drilling. Well development waters were also segregated by well and contained in 55-gallon steel drums. The drums were moved from each IRP site to a centralized staging area at the Base. Recommendations regarding disposition of drill cuttings are provided in Appendix G.

Equipment decontamination water was contained in a 4,000-gallon polyethylene tank. At the completion of sampling activities, on May

26, 1995, water samples were collected from the tank using a disposable bailer. The samples were submitted for laboratory analysis and were analyzed for VOCs using EPA Method 8010/8020, TPH using EPA Method 8015 Modified (JP-4 and gasoline standards), and metals including cadmium, chromium, copper, lead, nickel, and zinc using EPA Method 6010. These analytical methods were chosen according to City of Reno guidelines and based on conversations with Mr. Dennis Dobyns, Environmental Control Section, City of Reno.

According to Mr. Dennis Dobyns, water contained in the tank had to meet drinking water standards to be acceptable for discharge into the sanitary sewer. Analytical results of tank water samples indicated that benzene was the only compound detected at a concentration above federal drinking water MCLs. No federal drinking water MCLs are available for TPH.

Water contained in the tank was resampled on June 20, 1995. The sample was analyzed for BTEX using EPA Method 8240, and TPH using EPA Method 8015 Modified (gasoline standard). TPH was not detected above detection limits, and BTEX were detected at concentrations lower than federal drinking water MCLs. Based on these results, the water contained in the tank was discharged to the sanitary sewers at the NVANG Base. Analytical results for both rounds of tank water sampling are included in Appendix G.

Well development and sample purge water was containerized in 55-gallon steel drums. Recommendations regarding disposition of this containerized water are provided in Appendix G.

Solid wastes generated during the RI field work (paper and plastic) were disposed of with regular Base trash.

INVESTIGATION FINDINGS

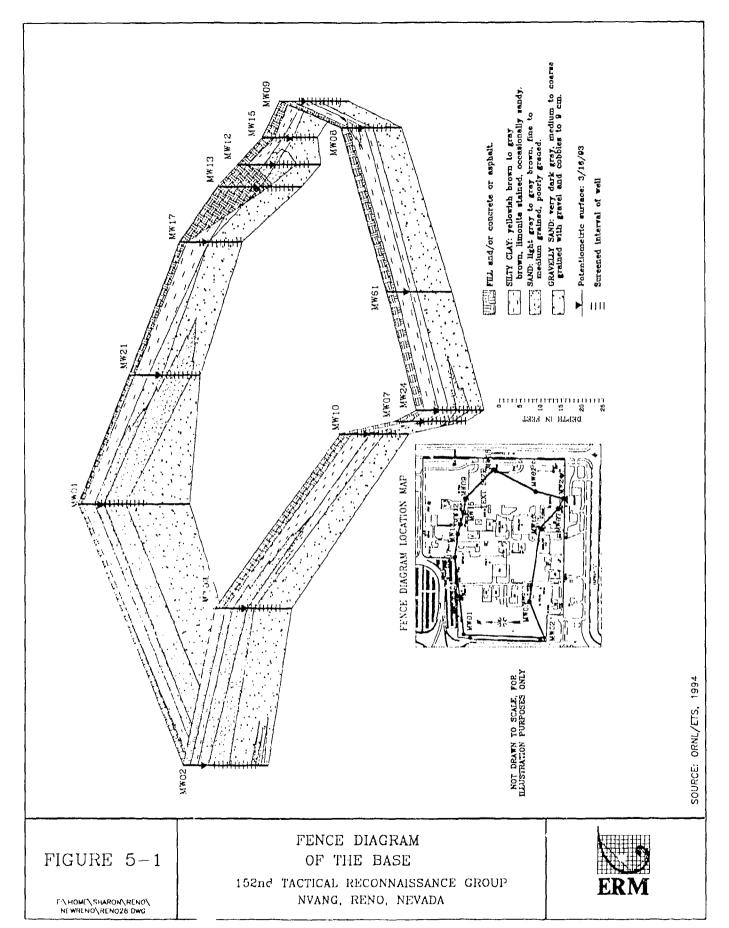
The following section presents a summary of RI findings at the NVANG Base, including information regarding basewide geologic and hydrologic conditions, background soil and ground water quality, and site characterization findings for IRP Sites 4, 5, 7, and 14. This section also provides conclusions based on the findings for the four IRP sites investigated.

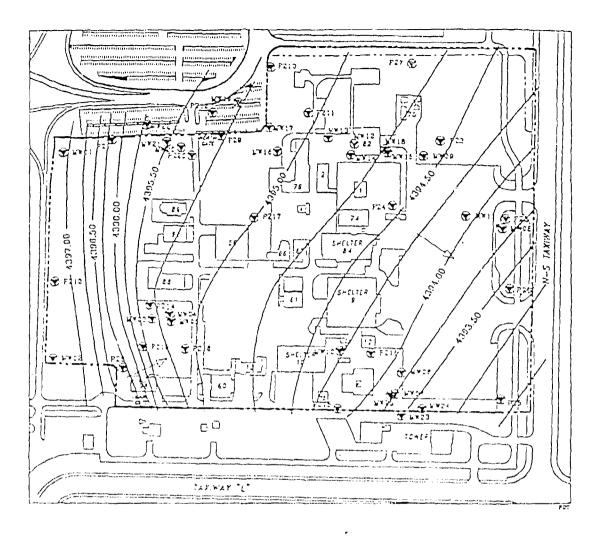
5.1 Basewide Geologic and Hydrogeologic Investigation Results

Review of data collected during both RI and SI drilling activities suggests that the near-surface geology consists of lacustrine silty clay underlain by alluvial sand and gravel. A fence diagram for the entire base was prepared by ORNL/ETS as part of the SI (Figure 5-1). The fence diagram illustrates some of the relationships between the surface silty clay and underlying alluvium. On the western side of the Base, the surface silty clay is underlain by a fine-grained sand unit containing varying amounts of site. This fine-grained sand unit progressive thins and becomes coarser grained from west to east. The fine-grained sand is underlain by a well-graded gravelly sand with varying amounts of gravel and cobbles. The top of the gravelly sand unit is typically encountered at depths ranging from 5 to 10 feet below ground surface (bgs) and is the most hydrologically significant unit at the Base, based on aquifer testing, as discussed below.

Ground water occurs in the course grained alluvium (sand and gravelly sand) at the Base. The surface silty clay layer acts as a confining unit for the underlying coarse grained alluvium in areas at the NVANG Base where the elevation of the piezometric surface in the coarse grained alluvium is above the base of the surface silty clay layer. In these areas, ground water is initially encountered immediately below the bottom of the surface silty clay layer. After this layer is penetrated by a borehole or well, water levels rise to elevations above the bottom of the confining unit.

Water level measurements were measured during both SI and RI activities for the purpose of preparing potentiometric maps for the Base. Figures 5-2 through 5-4 are potentiometric maps for the Base and





-4394 00 - FEET ABOVE MEAN SEA LEVEL --- PASE BOUNDARY

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CONTOUR INVESTIGATION OF THE

MATER-LEVEL MEASUREMENTS TAKEN 10/4/92



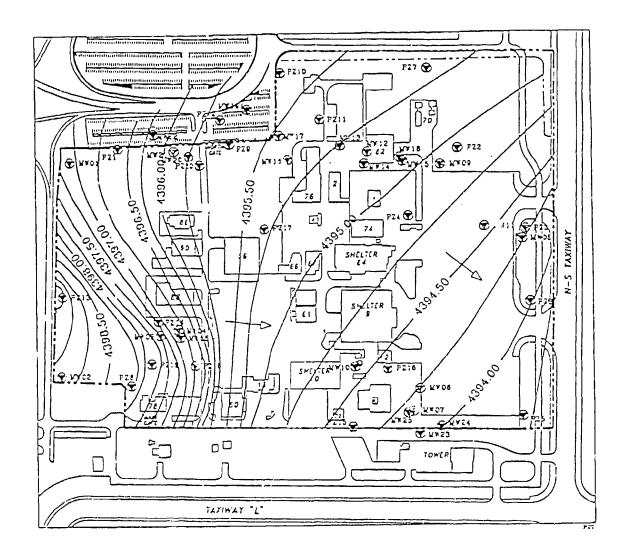
SOURCE: ORNL/ETS, 1994

FIGURE 5-2

F \HOME\SHAROM\RURO\ NEWRENC\FGS- 2TB DWG POTENTIOMETRIC SURFACE
DECEMBER 1992

152nd TACTICAL RECONNAISSANCE GROUP NVANG, RENO, NEVADA





-4394.00 - FEET ABOVE MEAN SEA LEVEL --- BASE BOUNDARY

→ PIEZCMETER/MONITORING WELL LOCATION

CONTOUR INTERVAL: .25 It WATER-LEVEL MEASUREMENTS TAKEN 2/3/93



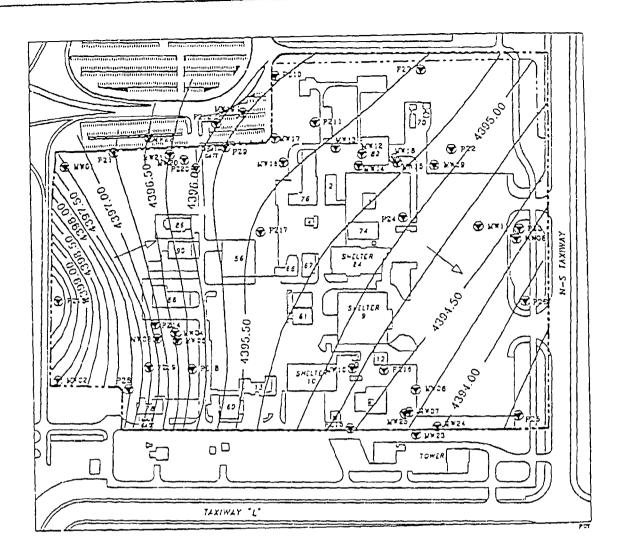
SOURCE: ORNL/ETS, 1994

FIGURE 5-3

F:\HOME\SHARON\RENO\ NEWRENO\FG5-3TB.DWG POTENTIOMETRIC SURFACE FEBRUARY 1993

152nd TACTICAL RECONNAISSANCE GROUP NVANG, RENO, NEVADA



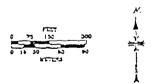


-- 4394.00 -- FEET ABOVE MEAN SEA LEVEL --- BASE EOUNDARY

FIEZOMETER/MONITORING WELL LOCATION

CONTOUR INTERVAL: .25 ft

WATER-LEVEL MEASUREMENTS TAKEN 3/16/93



SOURCE: ORNL/ETS, 1994

FIGURE 5-4

F:\HOME\SHARON\RENO\ NEWRENO\FG5-4TB.DWG POTENTIOMETRIC SURFACE
MARCH 1993

152nd TACTICAL RECONNAISSANCE GROUP NVANG, RENO, NEVADA



were constructed based on data collected during SI activities for the months of December 1992, February 1993, and March 1993. Figures 5-5, 5-6, and 5-6A present potentiometric maps based on data collected during RI activities in May 1995, August 1995, and November 1995. It is apparent that the RI potentiometric maps are less detailed than those constructed based on SI data. The reason for this difference in detail is that all of the piezometers constructed during the SI had been abandoned prior to the start of RI field work. Additionally, several SI monitoring wells had been either destroyed and/or covered up by various construction activities at the Base. Table 4-3 presents a summary of the remaining monitoring wells at the Base.

Despite the difference in degree of detail, all of the potentiometric maps presented illustrate the general east-southeast direction of ground water flow at the Base. Additionally, it appears that only minor variation (i.e., generally less than 2 feet) has occurred in water levels measured at individual monitoring wells during the period December 1992 through November 1995.

Hydraulic testing was performed by ORNL/ETS as part of the SI for the Base to determine the overall hydraulic properties of the aquifer. Figure 5-7 shows the monitoring wells at which aquifer testing was conducted. Estimated transmissivity values of the shallow aquifer at the Base range from 39 to 3,110 feet squared per day, as summarized on Table 5-1.

Ground water monitoring has been performed at three monitoring wells located adjacent to IRP Site 12 - Aircraft Parking Apron Area (monitoring wells MW08, MW26, and MW27). IRP Site 12 - Aircraft Parking Apron Area was previously investigated by OpTech, as detailed in Section 2.2.2 of this report. Table 5-2 summarizes the monitoring results of these monitoring wells, including data collected during RI monitoring activities. The most significant finding is the historic detection of TCE, and its byproducts cis-1,2-dichloroethylene (cis-1,2-DCE) and trans-1,2-dichloroethylene (trans-1,2-DCE) in ground water samples collected from monitoring well MW08. TCE has occasionally been detected in monitoring well MW08 ground water samples at concentrations ranging from 1 to 27 µg/l. The current MCL for TCE is 5 μg/l. Other VOCs have also been detected in Site 12 - Aircraft Parking Apron Area ground water samples: 1,1-dichloroethane, 1,1,1trichloroethane, and 2-butanone. Neither these other VOCs nor cisand trans-1,2-DCE have been detected at concentrations exceeding their respective MCLs.

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TABLE 5-1

Results of SI Aquifer Testing

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Fest Location Identifier	IRP Site	Screened Aquifer Thickness, Feet	Transmissivity, Feet Squared Per Day	Hydraulic Conductivity, Feet Per Day	Hydraulic Conductivity, Centimeters Per Second	Estimated Gradient	Estimated Average Linear Velocity, Feet Per Year
MW20	Site 3	6.5	3,110	479	1.69E-01	2.86E-03	2,000
MW21	Site 3	6.5	1,816	279	9.84E-02	2.86E-03	1,160
MW02	Site 4	8.6	39	4	1.41E-03	3.28E-03	19
MW03	Site 4	6.0	61	7	2.36E-03	3.17E-03	32
MW23	Site 7	6.5	250	38	1.34E-02	5.26E-03	290
MW08	Site 12	7.0	1,628	232	8.18E-02	2.13E-03	720
PZ02	Site 12	7.0	2,774	396	1.40E-01	2.13E-03	1,230

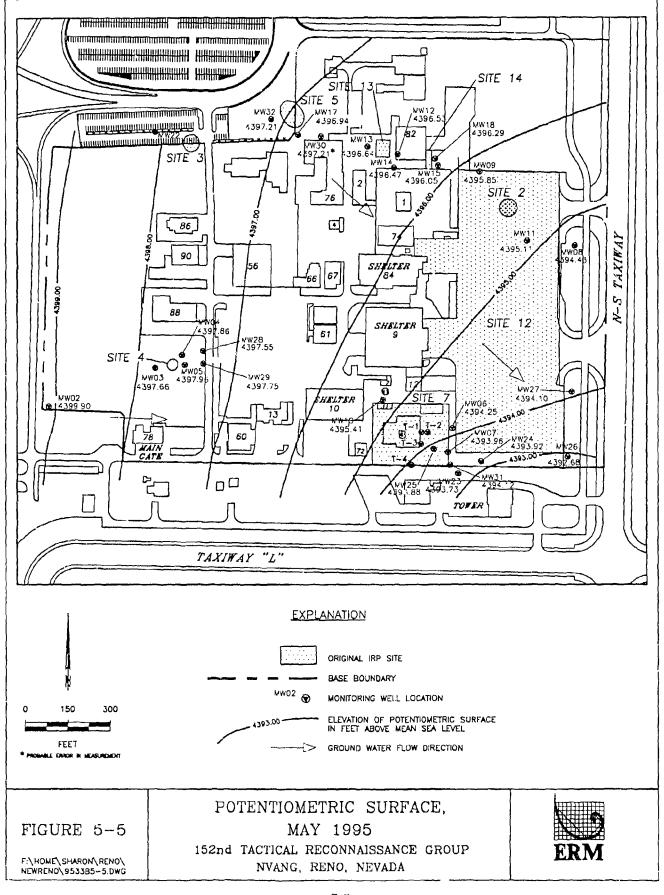
Source of Hydraulic Parameters: ORNL/ETS, 1994. In performing this analysis ORNL/ETS considered only the permeable portions of the aquifer adjacent to the well screen.

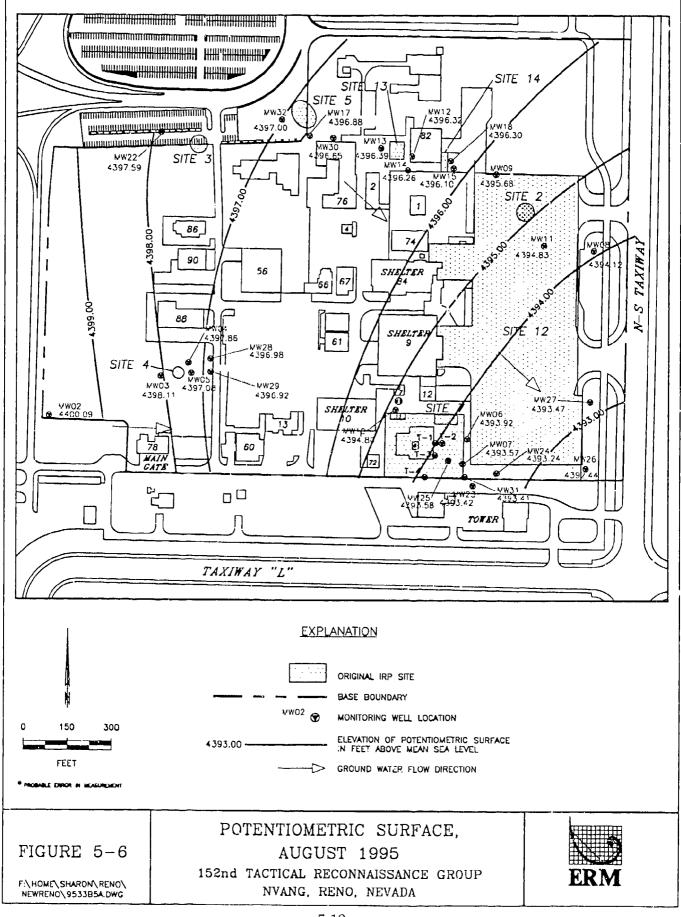
Assume effective porosiity of 25 percent for velocity computation.

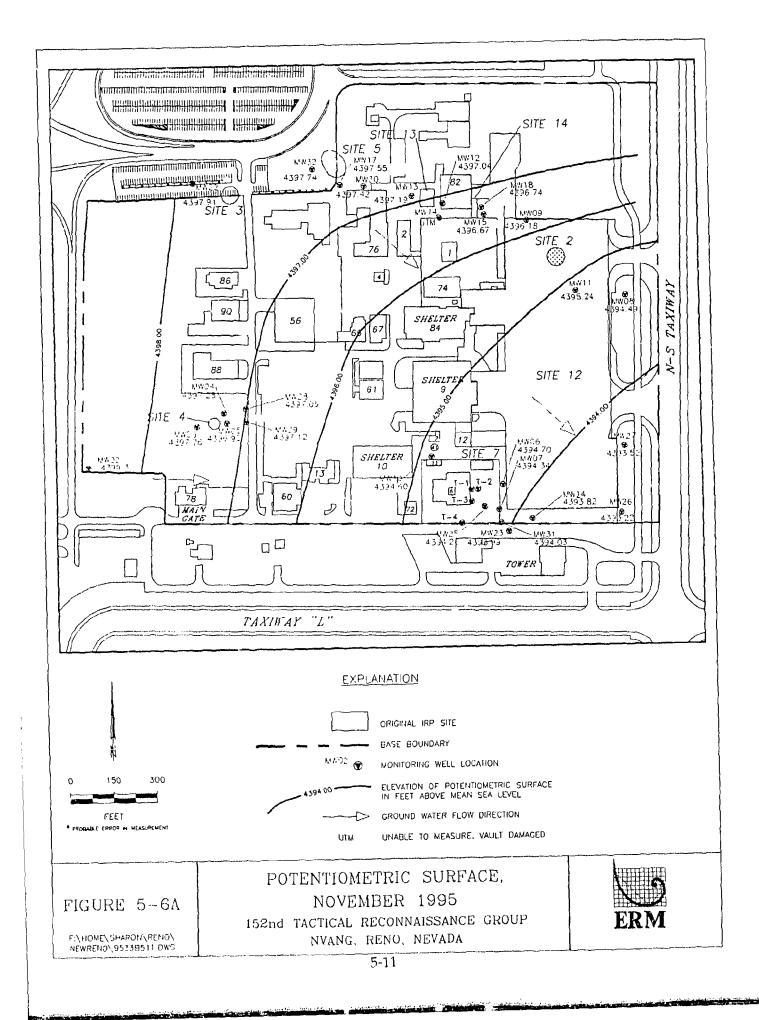
TABLE 5-2
Organic Compounds Detected in Site 12 - Aircraft Parking Apron Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

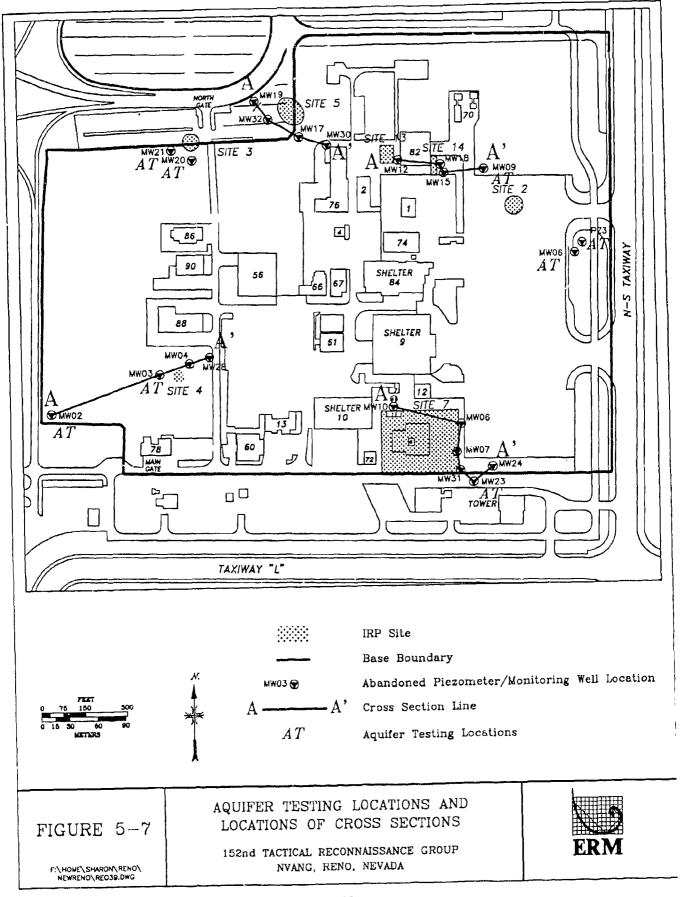
	!		utoring.	Monitoring Well MW08	98	•	,		!	;	N'onito	Youtloring Well MW26	MW26	:	;			Monit	Monitoring Well MW27	AW27	 	į
Compound	12/92 3/93 11/93 4/94 7/94 9/94 1/95	3 4/9	1/4	9/94	- 1	5/45	8/75 11	/95 11/	93 4/5	/ 	6/6 : 16	4 1/95	8/75 11/95 11/93 4/94 7/94 9/94 1/95 5/95		11/95	11/93	46/3	8/95 11/95 11/93 4/94 7/94 9/94	/94 1/95	5 5/95	5/95 8/95	11/95
;			,				>	'OC conce	ntration is	n microg	VOC concentration in micrograms per liter	iler			. !				:			
Trichlomethylene	6.0 2.01			- F1	h	v.	_															
1,1-Dichloroethane						•			· .					!	7	:		:		:	:	
1.2-Dichloroethylene (Total)	. 18			,	•													•	:			
Cis-1,2-Dichloroethylens		6	6	Ç		-					i											
frans-12-Dichloroethylene			•	2.3	<u>.</u>	2	. 33	3.4									:				····•	
1,1,1-Trichloroethane	:	:	•		:				£ .	٠ .			•	:				:				
2-Butanone	:		1	:					:	:			·	!	į		2.1	;	. ;	!		
				•		•	-	TPH conce.	ntration i	n millig	TPH concentration in milligrams per liter	Ē			:			:	!	:	į	
TTH	0.051 2.9				SN			2.6				2				- -			SZ			

VOC = volatile organic compound TPH = total petrolerum hydrocarbons .. = total petroleta. NS = not sampled
9









5.2 Background Sampling Results

The ORNL/ETS SI included collection of background soil and ground water samples. The following sections summarize the results of ORNL/ETS's background investigation.

5.2.1 Background Soil Investigation Results

ORNL/ETS drilled and sampled two background soil borings during SI investigation activities. The borings were subsequently completed as monitoring wells MW01 and MW02 (Figure 5-5). The background soil boring sites were placed in areas reported to have had no waste management activities and in areas upgradient of the IRP sites under investigation.

Four soil samples were collected for chemical analysis from the boring located at monitoring well site MW01 at depths of 2, 4, 6, and 8 feet bgs. Three soil samples were collected for chemical analysis from the boring located at monitoring well site MW02 at depths of 4, 6, and 8 feet bgs. The soil samples analyzed for both VOCs and SVOCs.

Three VOCs were detected in background soil samples: chloroform (2 μ g/kg), methylene chioride (200 μ g/kg), and acetone (4,400 μ g/kg). Two SVOCs were detected in background soil samples: bis(2-ethylhexyl)phthalate (44 +o 69 μ g/kg) and 4-nitrophenol (43 μ g/kg).

5.2.2 Background Ground Water Investigation Results

ORNL/ETS collected background ground water samples from monitoring wells MW01 and MW02 during two sampling rounds during SI investigation activities. Three VOCs were detected in background ground water samples: chloroform (2 μ g/l), toluene (1 μ g/l), and carbon disulfide (9 μ g/l). Three SVOCs were detected in background ground water samples: di-n-butyl phthalate (1 to 2 μ g/l), butylbenzyl phthalate (1 μ g/l), and diethyl phthalate (1 μ g/l).

5.3 Site 4 - Former FTA

The following is a description of RI activities at IRP Site 4 - Former FTA, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

5.3.1 Geologic and Hydrologic Investigation Results

The subsurface lithologies encountered at Site 4 - Former FTA are fill material, yellowish-brown to gray silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-8 was constructed using lithologic data from monitoring wells MW02, MW03, MW04, and MW28.

Approximately 2 feet of fill material are present across the entire site. The underlying silty clay is approximately 2 feet thick across most of the site but thickens to 5 feet in monitoring well MW04 on the eastern edge. The underlying poorly graded sand averages about 4 feet in thickness at Site 4 - Former FTA and gradually thickens to the southwest. Thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 4 - Former FTA monitoring wells were evaluated and the ground water flow direction was determined to be to the east during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A.

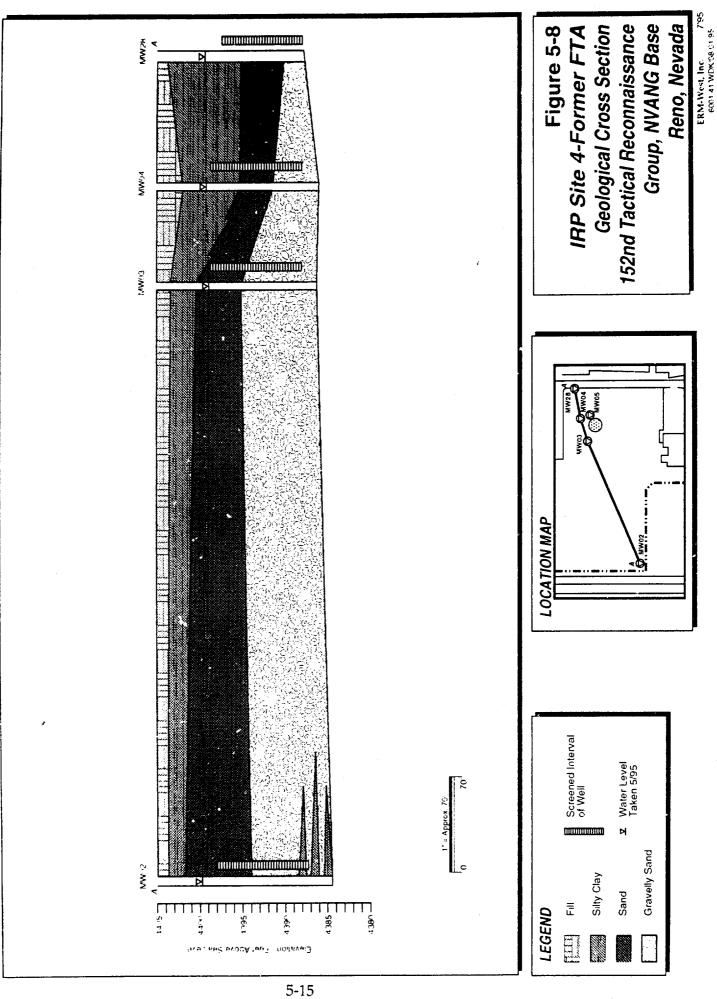
Confined aquifer conditions were encountered during drilling of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-8 illustrates that water level elevations measured in monitoring wells MW04 and MW28 are approximately 4 feet above the base of the confining unit.

5.3.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.3.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB4-1 through SB4-7,



located at Site 4 - Former FTA. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-3 summarizes the soil sampling program for chemical analysis.

Chain-of-Custody Records are included in Appendix E. Complete analytical results for soil samples collected from soil borings drilled at Site 4 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory analysis are presented in Tables 5-4 through 5-6. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB4-4-5.5 denotes the soil sample collected at soil boring SB4-4 at a depth of 5.5 to 6.0 feet bgs.

- 5.3.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB4-2 and SB4-4 through SB4-7: acetone (24 to 1,910 μ g/kg), benzene (79 μ g/kg), 2-butanone (475 to 1,160 μ g/kg), chlorobenzene (245 to 2,350 μ g/kg), ethylbenzene (58 to 3,400 μ g/kg), toluene (120 μ g/kg), and xylenes (976 to 12,000 μ g/kg). In general, the highest VOC concentrations in Site 4 Former FTA soil samples were detected in sample SB4-5-7.5 (Table 5-4 and Figure 5-9).
- 5.3.3.2 Semivolatile Organic Compounds. SVOCs were detected only in soil samples collected from soil boring SB4-5. The following SVOCs were detected in one or more soil samples collected from this soil boring: 1,2,4-trichlorobenzene (2,640 to 10,500 μ g/kg), 1,2-dichlorobenzene (2,940 to 22,500 μ g/kg), 1,3-dichlorobenzene (1,170 to 8,320 μ g/kg), 1,4-dichlorobenzene (1,220 to 8,960 μ g/kg), 2,4-dichlorophenol (240 μ g/kg), 2-methylnaphthalene (634 to 728 μ g/kg), and 4-methylphenol (659 to 714 μ g/kg). In general, the highest SVOC concentrations in Site 4 Former FTA soil samples were detected in soil sample SB4-5-/.5 (Table 5-5 and Figure 5-9).
- 5.3.3.3 Total Petroleum Hydrocarbons. TPH were detected at concentrations ranging from 3.42 to 1,400 milligrams per kilogram (mg/kg) in soil samples collected from soil borings SB4-3, SB4-5, and SB4-6. The highest TPH concentration in Site 4 Former FTA soil samples was detected in soil sample SB4-5-7.5 (Table 5-6 and Figure 5-10).

5.3.4 Ground Water Investigation Results

Ground water samples were collected from Site 4 - Former FTA in May 1995 from monitoring wells MW03, MW04, MW05, MW28, and MW29. Monitoring wells MW04, MW05, MW28, and MW29 were resampled in July 1995 for VOC analysis due to quality control

TABLE 5-3

Summary of Site 4 - Former FTA Soil and Ground Water Sample Collection Activities

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
	SB4-1	5/16/95	1.5, 3.5, 5.5, 9.5
	SB4-2	5/17/95	2, 3.5, 5.5, 7.5
	SB4-3	5/17/95	1.5, 3.5, 5.5
Soil	SB4-4	5/16/95	1.5, 3.5, 5.5, 7.5, 9
	SB4-5	5/16/95	1.5, 3.5, 5.5, 7.5, 9
	SB4-6	5/16/95	1.5, 5.5, 7.5, 10, 11.5
	SB4-7	5/17/95	1.5, 3.5, 5.5, 7.5
	мwоз	5/14/95 8/23/95 11/16/95	NA
	MW04	5/25/95 7/12/95** 8/23/95 11/15/95	NA
Ground Water	MW05	5/24/95 7/13/95** 8/24/95 11/16/95	NA
	MW28	5/24/95 7/12/95** 8/23/95 11/15/95	NA
	MW29	5/24/95 7/12/95** 8/23/95 11/15/95	NA

^{* =} Sample depth listed is at the top of a 6-inch sample interval

NA = not applicable

^{** =} Resampling date

FIN'AL

TABLE 5-4
Volatile Organic Compounds Detected in Site 4 - Former FIA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

							ن ا	oncentrations in r	Concentrations in micrograms per kilogram	am					
Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloroform	Methylene Chloride	2-Hexanone	:-Butanone	4-Methyl-2- pentanone	P.C.	TCE	Benzene	Ethylbenzene	Toluene	Aylenes (total)
SB4-1-3.5	5/16/95	88262	QN	Ω	Q	QN	QN	Ð	Ð	Ð	QN	QN	ΩN	Ð	QN
SB41-5.5	5/16/95	88263	ND	ND		Ð	S	ΩN	ON ON	Ð	£	ę.	QN	O.	Ð
SB4-1-9.5	2/16/95	88264	QN	Q	θN	QN	Q.	QN	QN	QN	QN	£	Q.	S	2
SB4-1-9.5*	5/16/95	88265	ΩN	£	£	Q	QN	2	£	£	£	£	QN	2	QN .
SB-4-2-20	5/11/6	88281	ક્ષ	ξ	2	ON	2	g	QN	£	£	QN	Ö	S	Ω
SB-12-55	5/11/6	88282	£	δ.	Ω.	S	8	£	Q.	ğ	£	£	ΩN	S	ΔN.
SB+2.75	26/11/9	88283	된 당	S	£:	2	2	£	QN	ę,	2	QN	QN.	8	QN
SB-43-15	26/11/9	88276	Ę	QN	2	QN	S	S.	Q.	S	£	£	ΩN	ON.	Q
SB-4-3-3.5	5/11/95	88279	QN.	£	S.	S	£	€N.	QN	S	g	Q.	QN	5	Q.
SB-43-55	5/11/65	86280	QN	Ę	£	ę.	Ş	CN.	Ę	£	£	QN	Ω	QV	<u>8</u>
SB4-4-5.5	5/16/95	88272	Ę.	S.	Ð.	ΩN	£	8	QN	£	£	£	Ω	S	Q
SB4.4.7.5	5/16/95	88273	24	S	Ω	Q	Ð	S	Ą	£	2	g	ΩN	Ð	8
SB4 4-9.0	2/16/95	88274	Q	Q	QN	Ž	S .	2	ON .	Ñ	S	Ð	Q.	S.	QN .
SB4-1-9.0*	2/16/95	88275	Q.	£	S.	문 :	δχ	8	Q.	£	B	Đ.	ΩN	Č.	Q.
SB4-5-5.5	5/91/5	60000	1,910	356	QX .	2	S.	0911	Ö	g	g	2	311	S	2,670
SB4-5-7.5	2/16/95	88270	1,750	2,350	QN	2	8	827	Q.	£	8	٤	3,400	120	12,000
SB4-5-9.0	5/16/95	88271	626	245	E I	욷.	ΩN	475	O.	£	£	Đ.	374	£	9,46
S84-6-5.5	5/91/5	88286	Q.	2	S.	2	QN	2	QN.	£	R	£	QN.	5 E	22
SB4-6-10.0	5/91/5	88267	201	S	된 [2	Q.	QN	QN	3	R	Q	8	8	QN .
SB4-6-11.5	5/16/95	88268	2	£	Ð,	2 2	Q.	2	2	£	g	Q.	ē	N O	QN
SB-£7-35	5/11/5	88288	£	:	Q.	Ð	S Z	QN	ON.	£	£	Q.	QN	₽.	QN
\$847-55	5/11/95	88285	ĸ		ļ	<u> </u>	QN.	Q	8	£	QN	£	<u>8</u>	Ð	Ð
SB-47.75	26/21/5	88286	Q.	CN	ND	Q.	QN	ΩN	ND	Ę	Ω	QN	QN	ON	ND
		Cleanup Levei	350,000	000'001	000'9	200	17,500	200,000	280,000	98	205	200	70,000	100,000	1,000,000

• = duplicate PCE = tetrachloroethylene TCE = trichloroethylene ND = not detected

Semivolatile Organic Compounds Detected in Site 4 - Former FTA Soil
152nd Tactical Recomaissance Group, NVANG, Reno, Nevada

								Concentration	Concentrations in micrograms per kilogram	's per kilogra	Ħ					
Location	Date Sampled	Laboratory Number	Acenzphthene Anthra	Anthracene	Benzo(a)	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Carbazole	Chrysene	Dibenzofuran	1,2-Dichloro- benzene	1,3-Dichloro- benzene	1,4-Dichloro- benzene	2,4-Dichloro- phenal
SB4-1-3.5	5/16/95	88262	NO	QN	2	S	Q.	QX	QX	e e	2	£	QN	ΩN	QN	ND
SB4-1-5.5	5/16/95	88263	QZ	QN	22	S	CZ	Ą	Q	ę,	ΩŅ	£	QN	ΩN	S	S
SB4-1-9.5	5/16/95	88264	QN	ON	QZ	QN	Q.	QN	ND	£	Q	QN	GN	ΩN	O.	S
SB4-1-9.5	5/16/95	88265	i . ₽	Ş	QN	S	2	S	£	£	£	S	GN	QN	Ð	Q.
SB4-2-2.0	5/11/6	88281	S	S	ΩN	2	Q.X	QZ	S.	ę	£	Š	ΩN	QN Q	Ω	δ
SB4-2-5.5	5/11/6	88282	Ę	g	2 2	QN	2	2	5	£	Q	Q	QN	QN	S	Q
SB4-2-7.5	5/12/95	88283	2	ΩŽ	ΩN	Σ	2	Ę	Ş	Ž	g	g	S	Ω Ω	2	N
\$84-3-1.5	5/17/95	85278	S	Q.	£	S	2	QZ	ρχ	Q.	£	S	Ę	Q.	S	N Q
SB4-3-3.5	5/17/95	68279	S	ΝΩ	£	£	S	ΩN	S	ξ.	g	Q	QN	ND	ON N	S.
SB4-3-5.5	5/17/95	88280	ę	Q.V	2	뒫	£	2	8	Q	£	Q	ND	QN	Ş	Ω
SB4-4-5.5	5/16/95	24238	ΩV	Ω	S	ND	S.	O Z	ΩŽ	Ω	Ŋ	ON	ND ON	QN	Z	QX
SB44-7.5	5/16/95	88273	ΩN	ΩN	Ω	£	£	2	ΩN	QN	Q	ON	ND	QN	٤	£
SB4-4-9.0	5/16/95	88274	ďΝ	θX	S	£	Ę	ΩX	ΩN	2	Ž	ON	ΩN	ΩN	2	£
SB4+9.0	5/16/95	88275	ΩN	£	ě	2	2	2	ΩN	S	£	ON	NO.	QN	Q	QX
SB4-5-5.5	5/16/95	88269	QX	S	£	S.	Š	2	ΩN	£	£	ON	5 E	3,440	3,650	Ω
SB4-5-7.5	26/91/5	88270	QN	Q.	ΩN	ę.	S.	Ω	N.	S	Q	ON	22,500	8,320	8,960	240
SB4-5-9.0	5/16/95	1/288	ON	Q	ON	ON	QN	S	ND	S.	Q	ON	2,940	1,170	1,220	£
SB4-6-5.5	5/16/95	88266	9	Q	욷	£	Q	g	ΝΩ	£	S	ND	ę.	S.	8	Q.
Sb4-6-10.0	\$/16/95	88267	2	QΝ	ΩŽ	Q	2	£	£	ğ	Q	Ω.	Q.	QN	2	2 8
SB4-6-11.5	5/16/95	88268	2	ΩN	R	QN	ON ON	S C	ę,	£	g	Q	£	ΩN	٤	Q.
SB4-7-3.5	5/11/62	882288	ΩŽ	Q	ΩX	S	OZ.	ę.	£	S	£	£	QN	ę.	£	S S
SB4-7-5.5	5/11/5	88285	£	2	2	£	2	2	S	2	呈	CN.	QN	ON	Q	Q
SB4-7-7.5	5/17/95	88286	Q	£	Ę	£	QN	Ş	ΩZ	ΘŽ	g	ON	ND	ND	S.	Ω
		Cleanup Level	210,000	000'050'1	200	500	200	140,000	200	180	- 084	14,000	000'09	000'09	7,500	11,000

TABLE 5-5 Semivolatile Organic Compounds Detected in Site 4 - Former FTA Soil 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

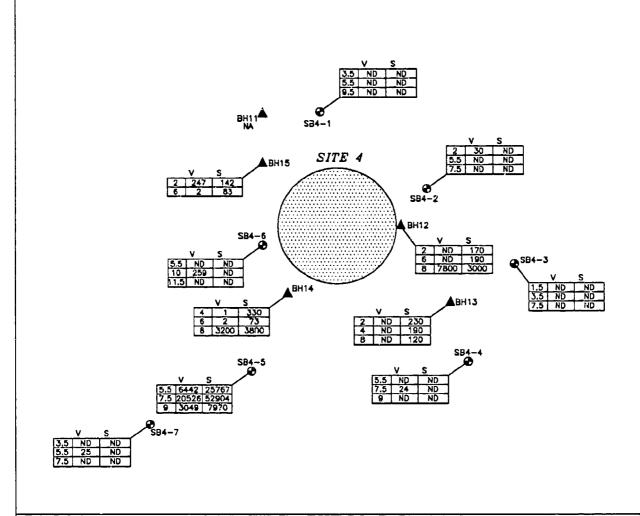
							Concentra	Concentrations in micrograms per allogram	s per allogram				
Location	Date Sampled	Laboratory Number	Dibenzo (a.h) anthracene	Fluorene	Fluoroanthene	Indeno (1,2,3-cd) pyrene	2-Methyl naphthalene	-Methylphenol	Naphthalene	Phenanthrene	Pyrene	12,4-Trichloro- benzene	bis(2-Ethylhexyl) phathalate
ا ا	5/16/95	88262	ΩN	ΩÑ	ΩN	ę	Š	QX	£	ΩŽ	Š	QN	QN
SB4-1-5.5	5/16/95	88263	2	D.	ΩN	Ę	2	S	S	Q	QN	QN	QN
SB4-1-9.5	5/16/95	88264	S	S	Q	2	2	2	2	£	ę	QN	QN
	5/16/95	88265	£	Ð	QX	2	2	S	£	ũ	Ę	QN	QN
0	5/17/95	88281	Q.	R	QN	2	ΩN	S	£	S	QN	QX	ND
584-2-5.5	5/17/95	88282	2	22	£	2	Ω.	S	£	S	0.	QX	QN
.5	5/11/95	882383	QN	ΩN	O.	Q.	2	2	2	N Q	Š	QN	ON
SB4-3-1.5	5/11/95	88278	QX	2	S.	Q.	2	2	g	Q.	Ş	QZ	Q
5	5/17/95	6/289	QN	ρN	Q	ΩN	£	ON.	£	QN	QN	QN	ND
5.	5/17/95	88280	2	£	2	OZ.	2	S	S	S	£	QN	QN
S	5/16/95	22238	Ş	5	S	ΩN	£	S	Ę	QN	ΩŽ	ΩN	ND
10	5/16/95	88273	2	8	Q	2	S	QN	QN	QX	ON.	ΝΩ	£
إ		88774	Q.	Š	Q	Ω	S	S	ON	ON	Ę	QN	Q.
	5/16/95	88275	Ω.	Ð.	2	R	S	S	QN	2	Ę	ΩZ	QN
SB4-5-5.5		69298	£	ξ.	QΖ	Z		714	QN	Q.N	£	6,410	QN
.5		88270	S	QN	S	Ω	728	629	QZ QZ	Q.	S	10,500	NO
SB4-5-9.0	5/16/95	88271	£	2	Q	£	QX	QN	ΩN	QN	£	2,640	6X
ιŲ	5/16/95	88266	£	문	2	2	Ω	Q.	Q.	Q.	£	Ω	QN
S84-6-10.0	5/16/95	88267	ΩN	£	2	S	Q	2	Č.	QN	Ę	ON DN	QV.
5	5/16/95	88268	Ω	£	5	£	Q	2	£	S	ĝ	Q	e S
SB4-7-3.5	5/17/95	68288	2	Ę	5	g	S	S .	£	Q	Q.	Ş	QN
SB4-7-5.5	5/17/95	88285	Q	S	5	S	Ω	웊	ΩŽ	S	£	Ð.	CN
SB4-7-7.5	5/17/95	68286	QX	£	5 E	ΩN	Q.	ΩN	£	£	Ş	Q	ON.
		Cleanup Level	200	140,000	140.000	200	140.000	200.000	140.000	140.000	110.000	7.000	009

• = duplicate ND = not detected

TABLE 5-6
Total Petroleum Hydrocarbons Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB4-1-3.5	05/16/95	88262	ND
SB4-1-5.5	05/16/95	88263	ND
SB4-1-9.5	05/16,′95	88264	ND
SB4-1-9.5*	05/16/95	88265	ND
SB4-2-2.0	05/17/95	88281	ND
SB4-2-5.5	05/17/95	88282	ND
SB4-2-7.5	05/17/95	88283	ND
SB4-3-1.5	05/17/95	88278	ND
SB4-3-3.5	05/17/95	88279	ND
SB4-3-5.5	05/17/95	88280	3.42
SB4-4-5.5	05/16/95	88272	ND
SB4-4-7.5	05/16/95	88273	ND
SB4-4-9.0	05/16/95	88274	ND
SB4-4-9.0*	05/16/95	88275	ND
SB4-5-5.5	05/16/95	88269	324
SB4-5-7.5	05/16/95	88270	1400
SB4-5-9.0	05/16/95	88271	178
SB4-6-5.5	05/16/95	88266	ND
SB4-6-10.0	05/16/95	88267	192
SB4-6-11.5	05/16/95	88268	ND
SB4-7-3.5	05/17/95	88288	ND
SB4-7-5.5	05/17/95	88285	ND
SB4-7-7.5	05/17/95	88286	ND
		Cleanup Level	210

^{* =} duplicate mg/kg = milligrams per kilograms TPH = total petroleum hydrocarbons ND = not detected



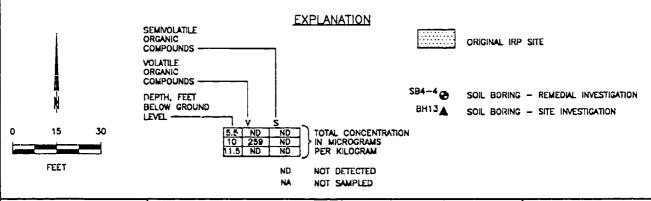
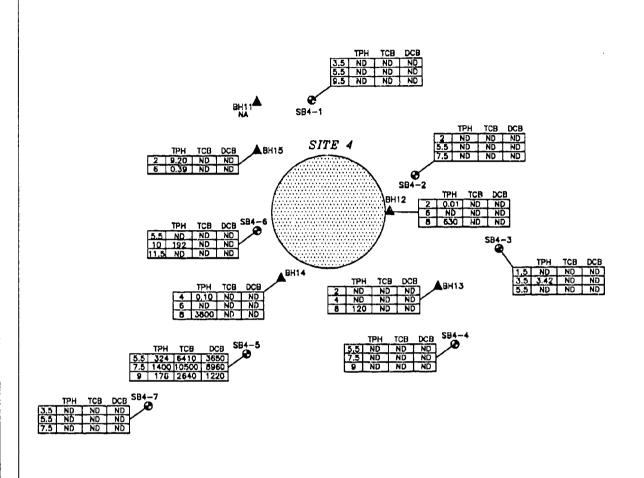


FIGURE 5-9

F:\HOME\SHARON\RENO\
NEWRENO\9533F5-8.DWG

IRP SITE 4 - FORMER FTA;
TOTAL VOLATILE ORGANIC COMPOUNDS AND
SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA





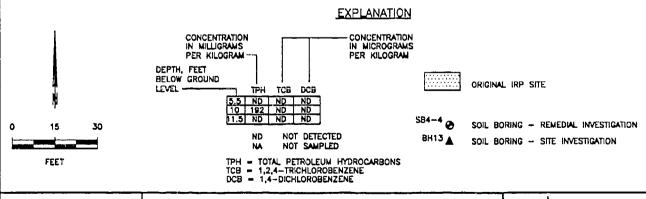


FIGURE 5-10

F:\HOME\SHARON\RENO\ NEWRENO\95335-9.DWG IRP SITE 4 - FORMER FTA,
TOTAL PETROLEUM HYDROCARBONS AND
SELECTED ORGANIC COMPOUNDS IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA



problems encountered by the analytical laboratory. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. The le 5-3 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 4 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory analyses are presented in Tables 5-7 through 5-9. Section 2.3.1 presents a summary of ground water chemical quality data collected from Site 4 - Former FTA monitoring wells prior to the RI.

5.3.4.1 Volatile Organic Compounds. VOCs were not detected in PI ground water samples collected from monitoring well MW03. Several VOCs were detected in ground water samples collected from monitoring wells MW04, MW05, and MW28: TCE (0.5 to 12 μ g/l), benzene (9 to 23 μ g/l), ethylbenzene (14 to 150 μ g/l), toluene (15 to 50 μ g/l), total xylenes (0.4 to 690 μ g/l), chlorobenzene (1 μ g/l), 1,2-dichlorobenzene (0.4 to 13 μ g/l), 1,3-dichlorobenzene (0.5 to 4.1 μ g/l), and 1,4-dichlorobenzene (0.5 to 5.3 μ g/l). Methylene chloride was the only VOC detected in monitoring well MW29 ground water samples. Detection of this compound is considered to be indicative of laboratory contamination because methylene chloride was also detected at a similar concentration in an associated trip blank (Table 5-7).

Figure 5-11 shows the horizontal extent of benzene in Site 4 - Former FTA ground water. Figures 5-12, 5-13, and 5-13A show the horizontal extent of TCE in ground water in the two areas where the compound has been detected in ground water underlying the NVANG Base: monitoring well MW05 at Site 4 - Former FTA and monitoring well MW08 at Site 12 - Aircraft Parking Apron Area.

5.3.4.2 Semivolatile Organic Compounds. SVOCs were not detected in RI ground water samples collected from monitoring wells MW03 and MW04. SVOCs were detected in ground water samples collected from monitoring wells MW05, MW28, and MW29 (Table 5-8). Naphthalene was detected at concentrations ranging from of 7 to 16 μ g/l in ground water samples collected from monitoring well MW05. Bis(2-ethylhexyl)phthalate was detected in ground water samples collected from monitoring well MW28 at a concentration of 2 μ g/l. 1,2-dichlorobenzene was detected in ground water samples collected from monitoring well MW29 at concentrations ranging from 1.5 to 3 μ g/l.

TABLE 5-7
Volatile Organic Compounds Detected in Site 4 - Former FTA Ground Water
132nd Tactical Recomaissance Group, NVANG, Reno, Nevada

							Concent	Concentrations in micrograms per liter	og states po	r liter						
Location Identifier	Date Sampled	Laboratory Number	Chlorobenzene Chloroform	Chloroform		1,3-Dichlorobenzene	1.2-Dichlorobenzere 1.4-Dichlorobenzere	Methlyene Chloride	1CE	Berzene	Benzene Ethylbenzene	Toluene	en-Xylene	c-Xylene	p-Xylene	Total Xykmes
MW03	5/14/95	88123	£	£	ΩN	ΩN	2	£	S	QN	S	ΩN	ũ	2	£	
MWG	8/13/95	8/23/95 114163-0007-SA	2	S S	ex	2	6X	8	Q.	£	Ž.	N.		1	1	₽
MW03	:1/16/95	:1/16/95 115997-0001-SA	Ð	Q	QN	S	Q.	Ω	6Z	£	Ž	Ş		ı		QN
MW04	7/12/95	91895	Q.	QN	Q,	ON	ĘŽ.	12	ΩN	£	Q.	Q.	ND (UZ)	£	ND (UZ)	'
MIN04	7/12/95	91896	QN	0.860)	ON .	2	5	£	뒫	ğ	£	Ş	ND (U.2)	Ž	ND (ZD)	1
MWOH	8, 13/95	8, 23/95 114163-0008-SA	QN	£	8	2	£	S.	g	Ð	£	£	,	1	1	Q
MWOH	11/15/95	11/15/95 115954-0016-5A	Q.	§	6X	S	QX	S	Ω	CN	2	Ş		1	1	ON
MW05	7/13/95	91883	Q	Q	ΩN	Q	Q	4	Ŋ	σ	14	15	Ę.	06	155	1
MW05	7/13/95	91884	ON ON	£	Ð	S	Q	2	2	Š	Q.	6	QN	g	Q.	:
MIWOS	8/24/95	8/24/95 114200-0002-SA	Ę.	2	31	11	1.2	Š	12	ສ	150	8	1	,	I	069
MW05	11/16/95	11/16/95 .115957-0005-SA	24	g	13	41	53	Ş.	4.1	2.5	2	11	1	-	1	75
MW05	11/16/95	11/16/95 115997-0006-SA	21	Q.	5.8	1.6	22	Ω	8.8	5.8	3.3	5.7	:	1	1	53
MW28	7/12/95	16816	1	Ę	2	m	e e	30)	50)	Š.	GN	Ω	(D+:	£	ND (UZ)	ŧ
MW28	8/23/95	114163-0002-SA	Q	S.	S	Ω	GZ:	2	2	ξ	£	S.	1	!	1	QN
MW28	11/15/95	11/15/95 115954-0015-5A	QN	Ω	S	£	θX	Q.	£	Q	Q	Ø	I.	:	ı	ND
MW29	7/12/95	18816	Q.	g	Ð	S	QX	S	£	Q	ND	ON	QX	QN	QN	1
MW29*	7/12/95	28816	Q.	S.	QN	£	ė.	S.	£	£	QV	ğ	CIN	QN	QN	I
MA.729	3/23/95	3/22/95 114163-0003-SA	8	QN	1.5	2	<u>8</u>	£	£	Ş	£	S.	1		1	Ω
MW29	11/15/95	115954-0014-SA	1.2	ĕ	œ	24	33	ND	ΩN	8	£	Ş	1	١	1	QN
		MCL	100	æ	09	009	75	5	N.	ν.	700	1,000	N.	Y.	- VX	10,000
		Geanup Level	100	Y.	009	009	አ	Y.	Ŋ	S	 82	1,000	ž	×2	¥X	10,000

• a duplicate

not detected

T.E. = trichloroethylene

(-) anot reported

M.C. = maximum contaminant level

N.A. = not available

TABLE 5-8

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada Semivolatile Organic Compounds Detected in Site 4 - Former FTA Ground Water

					Concentrations in	Concentrations in micrograms per liter	·liter		
Location Identifier	Date Sampled	Laboratory Number	1,2-Dichlorobenzene	2,4-Dimethylphenol	2-Methyl- naphthalene	Phenanthrene	Naphthalene	bis (2-Ethylhexyl)- phthalate	Di-n-octyl phthalate
MfW03	05/14/95	88123	ES.	Ü.X	QN	ΩN	QN	QN.	ND
MW03	08/23/95	114163-0007-SA	QN.	Q	Đ.	Ð	Đ.	ΩN	£
MW03	11/16/95	115997-0001-SA	ΩN	ND	ON	Q.	Q	Ð	ND
MW04	05/25/95	29888	2	ĆZ.	Q	QN QN	QN	Q	Q.
MW04	08/23/95	114163-0008-SA	Q	£	Q	QN O	ON.	Ð	£
MW04	11/15/95	115954-0016-SA	Q.	ON	Q	QN	DN.	Q	ND
MIW05	05/24/95	6228	(D) QN	Q	S	QN	7 (I)	S	S.
MW05	08/24/95	114200-0002-SA	QN	Q.	Ð	QN	16	Q.	QN
MW05	11/16/95	115997-0005-SA	S	8	Q.	Ð	Ð	2	S.
MW05*	11/16/95	115997-0006-SA	ON.	Ð	Q	£	£	S	QN
MW28	05/24/95	88782	N N	Ð	S	Ð	Ð	2 (1)	Q.
MW28	08/23/95	114163-0002-SA	Ð	Ð	Ę	Ð	£	S	£
MW28	11/15/95	115954-0015-SA	Ð	QN ON	Q.	ΩN	QN	QN	Ð
MW29	05/24/95	88780	3 (1)	QN.	ę.	Ð	Q	£	£
MW29*	05/24/95	88781	Ð.	QN	£	£	Q	Q	QN
MW29	08/22/95	114163-0003-SA	0.5	Q.	£	Ð	£	Ę	S
MW29	11/15/95	115954-0014-SA	ND	ON	QN	Q.	S.	Ð	Ą
		MCL	009	NA	NA	NA	NA	9	NA
		Cleanup Level	009	700	1,400	1,400	1,400	9	700

* = duplicate ND = not detected

(-) = not reported MCL = maximum contaminant level NA = not available

FINAL

TABLE 5-9

Total Petroleum Hydrocarbons Detected in Site 4 - Former FTA Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

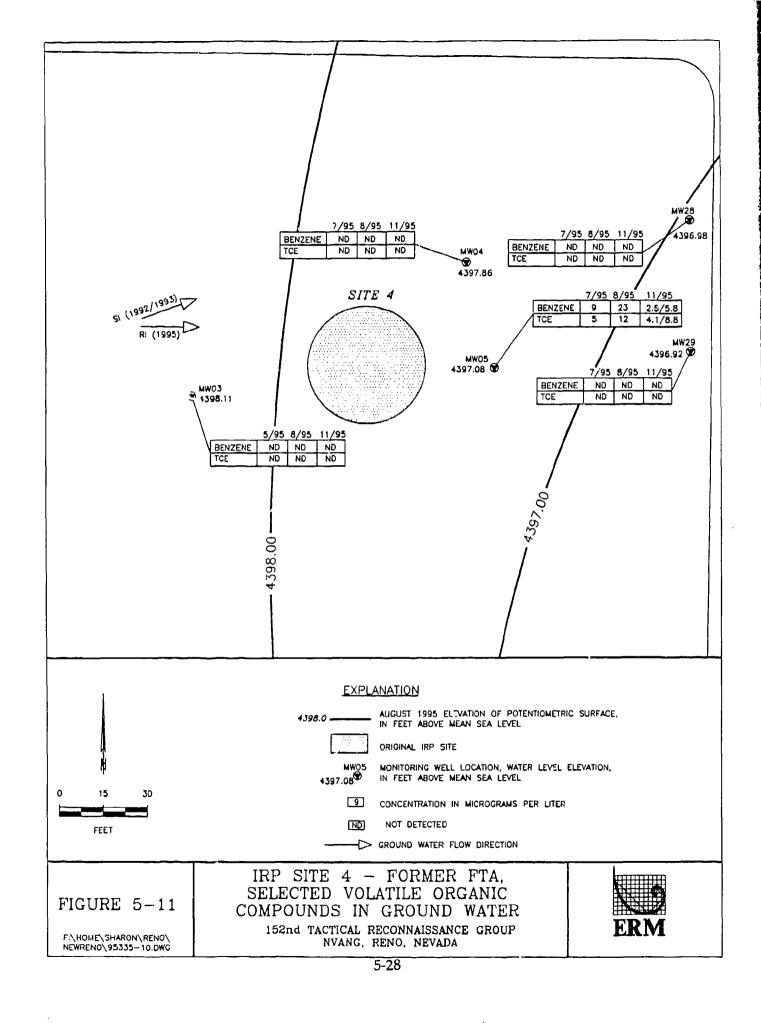
Location Identifier	Date Sampled	Laboratory Number	TPH, µg/l
MW03	5/14/95	88123	ND
MW03	8/23/95	114163-0007-SA	ND
MW03	11/16/95	115997-0001-SA	ND
MW04	5/25/95	88867	ND
MW04	8/23/95	114163-0008-SA	ND
MW04	11/15/95	115954-0016-SA	ND
MW05	5/24/95	88779	2,100
MW05	8/24/95	114200-0002-SA	5,000
MW05	11/16/95	115997-0005-SA	1,300
MW05*	11/16/95	115997-0006-SA	1,000
MW28	5/24/95	88782	ND
MW28	8/23/95	114163-0002-SA	ND
MW28	11/15/95	115954-0015-SA	ND
MW29	5/24/95	88780	ND
MW29*	5/24/95	88781	ND
MW29	8/23/95	114163-0003-SA	ND
MW29	11/15/95	115954-0014-SA	ND

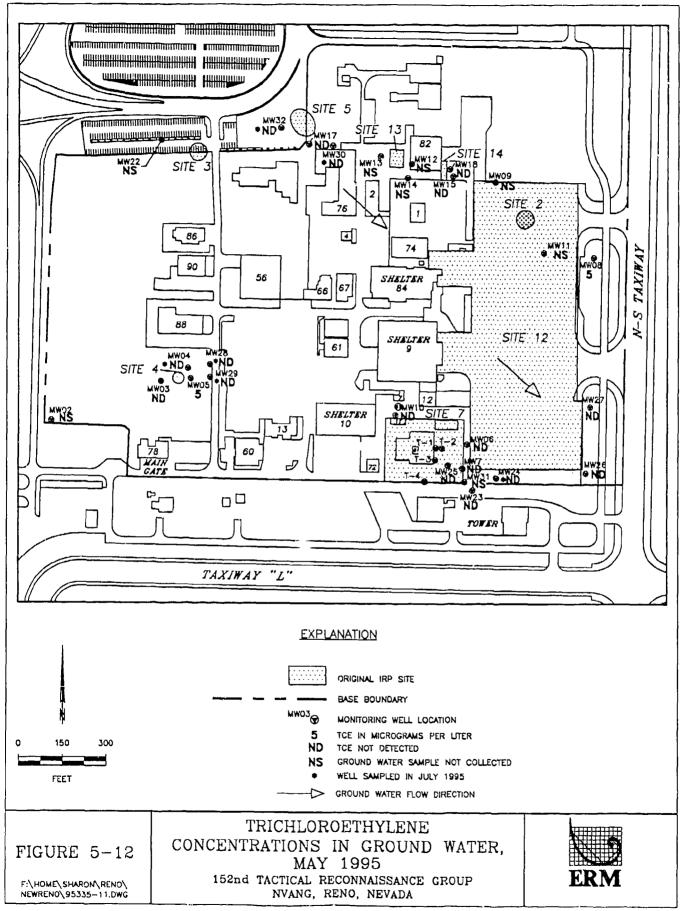
^{* =} duplicate

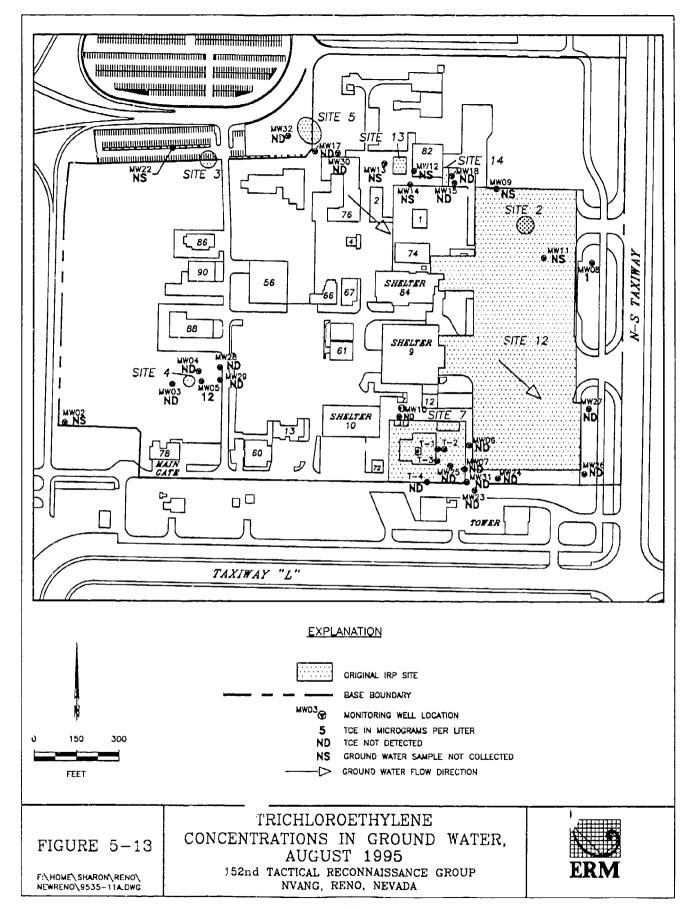
TPH = total petroleum hydrocarbons

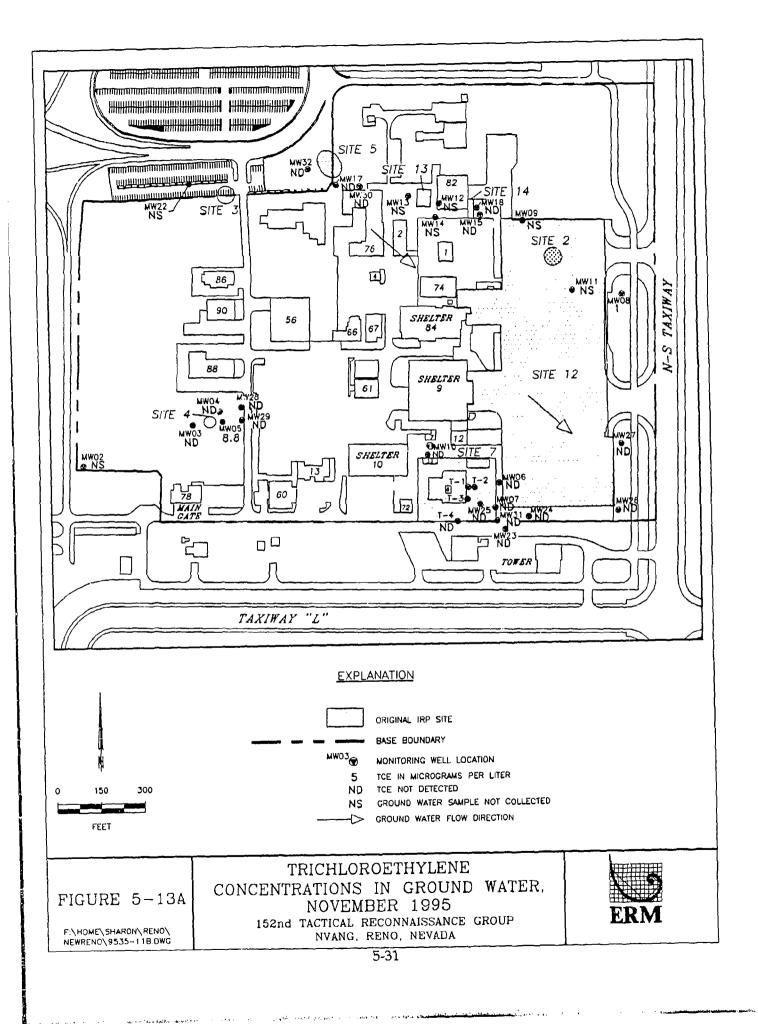
 $\mu g/1 = micrograms per liter$

ND = not detected









5.3.4.3 Total Petroleum Hydrocarbons and Lead. TPH were detected only in RI ground water samples collected from monitoring well MW05 (2,100 to 5,000 μ g/l), Table 5-9. Lead was not detected in RI ground water samples collected from monitoring wells MW03, MW04, MW05, MW28, and MW29.

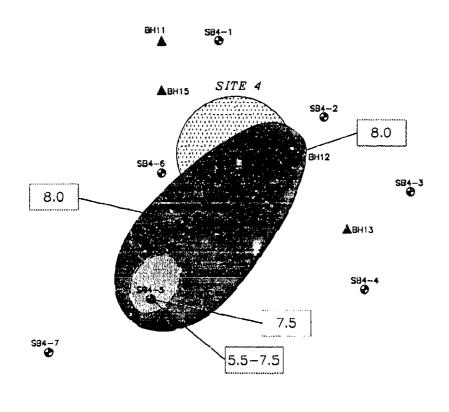
5.3.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 4 - Former FTA to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

- Ground water: TCE and benzene; and
- Soil: TPH, 1,2,4-trichlorobenzene (1,2,4-TCB), and 1,4-dichlorobenzene (1,4-DCB).

Figure 5-14 depicts the approximate area where organic compounds in soils exceed cleanup standards. This figure also shows the collection depths of those soil samples in which the TPH, 1,2,4-TCB and 1,4-DCB exceeded cleanup goals. In general, the area of soils exceeding cleanup standards is relatively small and is in the immediate vicinity of soil borings SB4-5, BH14, and BH12. This area is located immediately upgradient from monitoring well MW05 and potentially provides a continuing source of petroleum-derived hydrocarbons and other VOCs to Site 4 - Former FTA ground water. It is recommended that an FS be performed for Site 4 - Former FTA soils based on the potential threat to ground water quality posed by TPH, 1,2,4-TCB, and 1,4-DCB.

Figure 5-15 depicts the approximate area where organic compounds in ground water exceed cleanup standards with respect to TCE and benzene. This area is confined to the immediate vicinity of monitoring well MW05. When first sampled in March 1992, TCE and benzene concentrations in monitoring well MW05 ground water samples were 20 and 18 μ g/l, respectively. Ground water samples collected from monitoring well MW05 in July 1995 contained lower concentrations of TCE and benzene. Because an area of upgradient soils appear to be the source of benzene and other VOCs to ground water, remedial activities performed for Site 4 - Former FTA soils is likely to result in further reduction in concentrations of these compounds in ground water. Therefore, it is recommended that long-



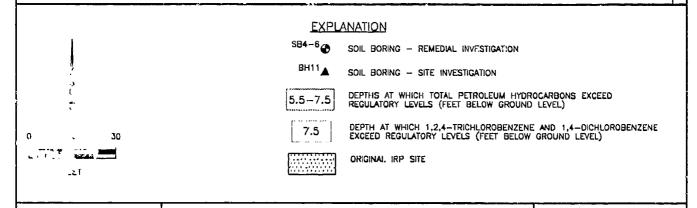


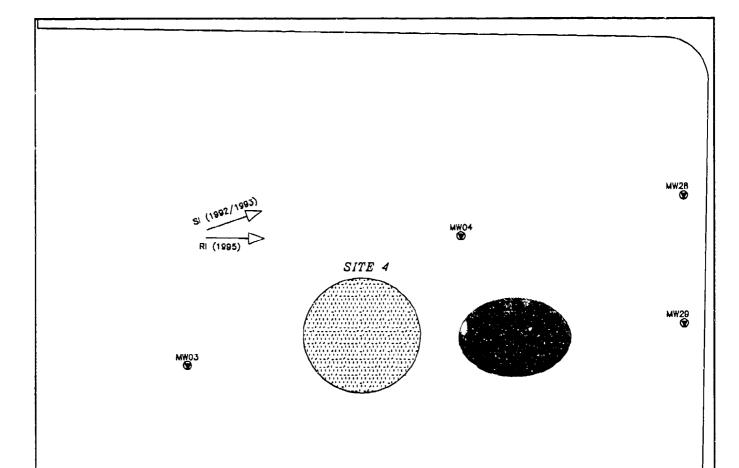
FIGURE 5-14

AREA OF IRP SITE 4 - FORMER FTA, SOILS EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

ERM

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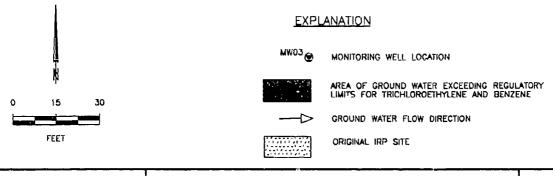


FIGURE 5-15

C:\RENOANG\9540\9540F515

AREA OF IRP SITE 4 - FORMER FTA, GROUND WATER EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA



term monitoring be performed for Site 4 - Former FTA ground water, based on the limited extent of ground water affected and based on the current declining concentration trend for TCE and benzene.

5.4 Site 5 - Former FTA

The following is a description of RI activities at IRP Site 5 - Former FTA, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

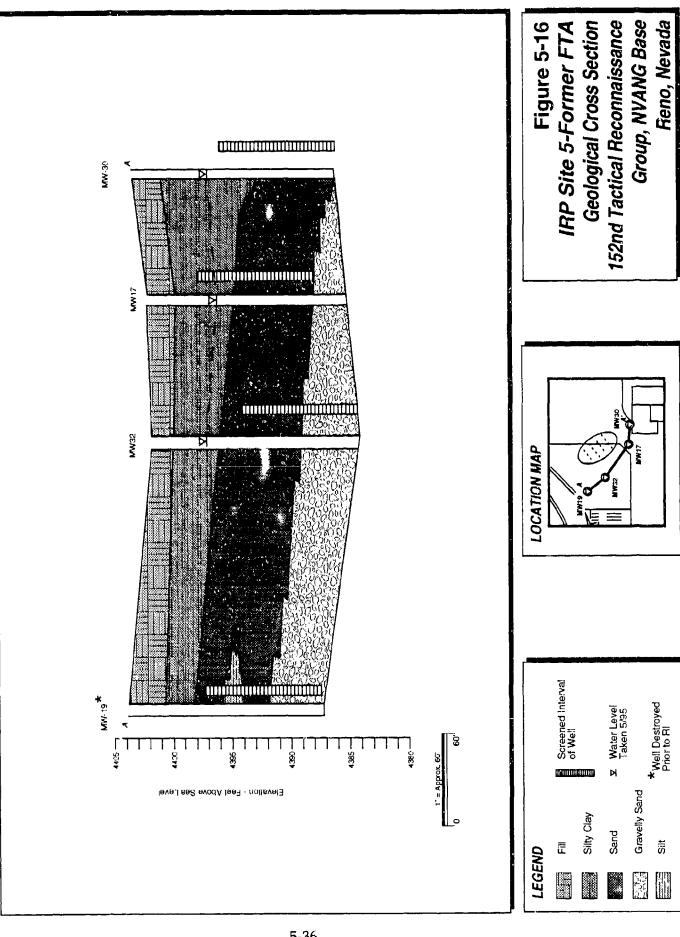
5.4.1 Geologic and Hydrologic Investigation Results

The subsurface encountered at Site 5 - Former FTA is comprised of fill material, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles and pale-gray to olive-brown sandy silt streaks. The geologic cross section presented in Figure 5-16 was constructed using lithologic data from monitoring wells MW17, MW19, MW30, and MW32.

Approximately 3 to 10 feet of fill material is present at Site 5 - Former FTA. The underlying silty clay reaches a maximum thickness of 6 feet in monitoring well MW17. At monitoring well MW17, the underlying well-graded sandy gravel is upwardly fining. At monitoring well MW19, the silty clay is underlain by 6 feet of well-graded gravelly sand that contains a 2-foot-thick silt lens. Underlying the gravelly sand is another 6 feet of poorly-graded, fine-grained, dark-olive sand. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 5 - Former FTA monitoring wells were evaluated and the ground water flow direction was determined to be to the southeast during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A.

Confined aquifer conditions were encountered during drilling all of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-16 illustrates that water level elevations measured in monitoring wells MW17, MW30, and MW32 are approximately 2 to 6 feet above the base of the confining unit.



5.4.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.4.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB5-1 through SB5-4, located at Site 5 - Former FTA. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-10 summarizes the soil sampling program for chemical analysis.

Complete analytical results for soil samples collected from soil borings drilled at Site 5 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-11 and 5-12. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB5-1-5.5 denotes the soil sample collected at soil boring SB5-1 at a depth of 5.5 to 6.0 feet bgs.

5.4.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB5-2 through SB5-4: 4-methyl-2-pentanone (41 $\mu g/kg$), acetone (13 to 277 $\mu g/kg$), ethylbenzene (211 $\mu g/kg$), toluene (255 $\mu g/kg$), and xylenes (15 to 2,040 $\mu g/kg$). In general, the highest VOC concentrations in Site 5 - Former FTA soil samples were detected in sample SB5-2-2 (Table 5-11 and Figure 5-17).

<u>5.4.3.2 Semivolatile Organic Compounds.</u> No SVOCs were detected in samples collected from Site 5 - Former FTA soil borings.

<u>5.4.3.3 Total Petroleum Hydrocarbons.</u> TPH were detected in only two samples collected from soil boring SB5-2 at concentrations ranging from 12.5 to 288 mg/kg (Table 5-12 and Figure 5-18).

5.4.4 Ground Water Investigation Results

Ground water samples were collected from Site 5 - Former FTA in May 1995 from monitoring wells MW17, MW30, and MW32. Monitoring wells MW30 and MW32 were resampled in July 1995 for VOC analysis

TABLE 5-10

Summary of Site 5 - Former FTA Soil and Ground Water Sample Collection Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
	SB5-1	5/21/95	1.5
	SB5-2	5/21/95	2, 3.5, 5.5, 7.5
Soil	SB5-3	5/21/95	1.5, 3.5, 5.5, 7.5
	SB5-4	5/21/95	1.5, 3.5, 5.5, 7.0
	MW17	5/12/95 8/24/95 11/14/95	NA
Ground Water	MW30	5/25/95 7/13/95** 8/22/95 11/14/95	NA
	MW32	5/24/95 7/13/95** 8/22/95 11/14/95	NA

^{* =} Sample depth listed is at the top of a 6-inch interval

NA = not applicable

^{** =} Resampling date

TABLE 5-11 Volatile Organic Compounds Detected in Site 5 - Former FTA Soil 152nd Tactical Recomaissance Group, NVANG, Reno, Nevada

			L					Conce	entrations in micr	Concentrations in micrograms per kilograms	ıms					
l	Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloreform	Methylene Chloride	2-Hexanone	2-Butanone	4-Methyl-2 - pentanone	Ę,	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
L	SB5-1-1.5	5/11/62	#8588	5 E	62	Q.	2	£	2	Q	₽,	Đ.	£	£.	QN.	ND
	SB5-2-2.0	5/21/95	88574	ā	Ω.	N.	Q	2	9	2	₽.	2	2	211	255	2040
	SB5-2-15	5/11/6	88575	31	Q.	S.	2	9	Q.	QN	2	e E	Q	GZ.	QN	Q
	SB5-2-7.5	5/21/65	88576	276	2	S S	S.	2	S S	∓	8	Q.	2	₽	Q	12
	SB5-3-3.5	5/21/95	88577	H	Q.	S	Q.	8	ON.	Q	₽	2	S	QN .	Q	Q
	SB5-3-5 5	5/21/65	8728	ĝ,	QN	QN	S.	QN	Q.	Q.	Q.	8	NO	ON ON	QN .	S
	SB5-3-7.5	5/21/95	88579	13	2	N O	8	2	9	QN	8	Ē	Ω Z	QN :	QN	Q
	SB5-4-3.5	\$/17/6	08580	11	₽	O.	Q.	ON ON	QN	2	₽.	8	£	Σ.	Q N	Q
	SB5-4-5-5	5/21/95	18588	Q.	QΝ	S.	Q	ΩN	Q.	Q	£ .	2	2	QN	Q	ç
	\$854-5.5	5/21/95	88582	12	QN .	9	8	GN.	O.	S S	£	2	2	₽	Q	Q.
	SB5-4-7 0	5/21/65	88583	Q.V.	ND	ND	ON	ND	ND	ND	ON	ND	65	ND	QN	ON
			Cleanup Level	350,000	100,000	6,000	500	17,500	210,000	289,000	200	200	200	70,000	100,000	1,000,000

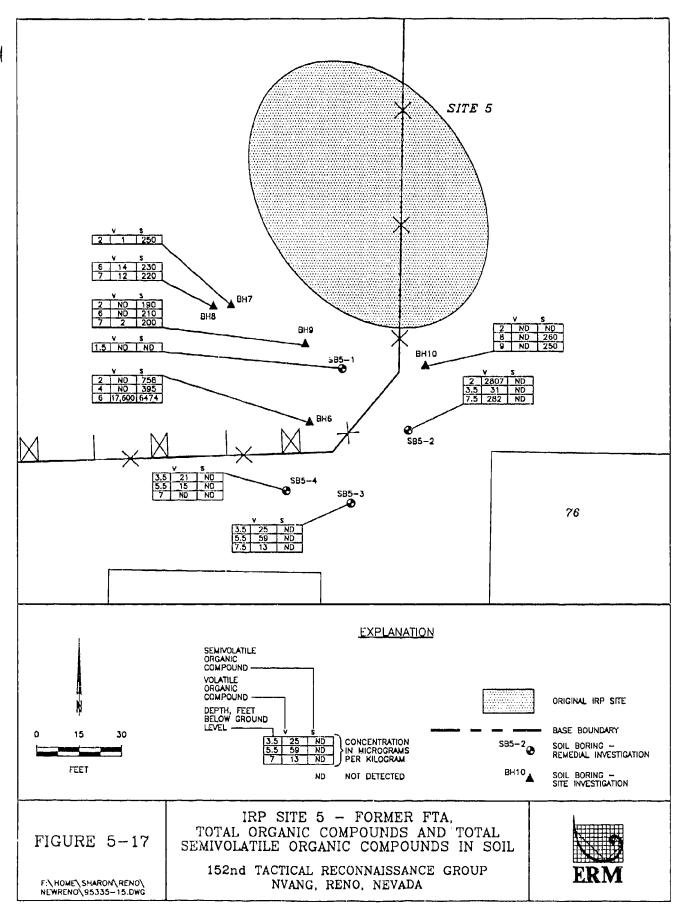
= duplicate PCE = tetrachloroethylene TCE = mchloroethylene ND = not detected

TABLE 5-12
Total Petroleum Hydrocarbons Detected in Site 5 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

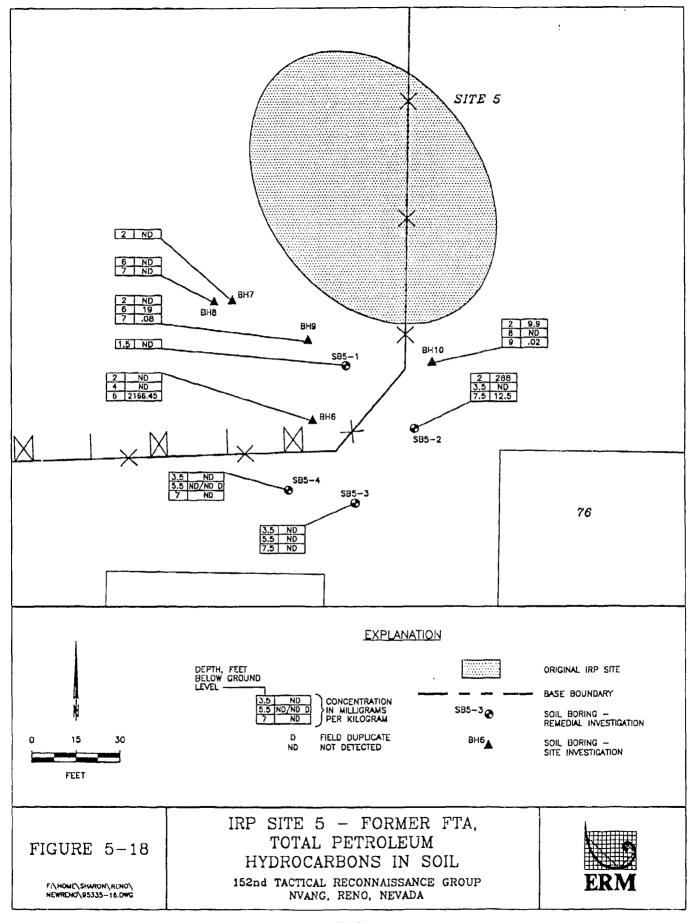
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Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB5-1-1.5	05/21/95	88584	ND
SB5-2-2.0	05/21/95	88574	288
SB5-2-3.5	05/21/95	88575	ND
SB5-2-7.5	05/21/95	88576	12.5
SB5-3-3.5	05/21/95	88577	ND
SB5-3-5.5	05/21/95	88578	ND
SB5-3-7.5	05/21/95	88579	ND
SB5-4-3.5	05/21/95	88580	ND
SB5-4-5.5	05/21/95	88581	ND
SB5-4-5.5*	05/21/95	88582	ND
SB5-4-7.0	05/21/95	88583	ND
	*	Cleanup Level	210

^{* =} duplicate mg/kg = milligrams per kilograms TPH = total petroleum hydrocarbons ND = not detected



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due to quality control problems encountered by the analytical laboratory. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-10 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 5 - Former FTA are available at the locations specified in Appendix F. A summary of detected compounds from the laboratory organic analyses are presented in Tables 5-13 and 5-14. Section 2.3.2 presents a summary of ground water chemical quality data collected from Site 5 - Former FTA monitoring wells prior to the RI.

5.4.4.1 Volatile Organic Compounds. Several VOCs were detected in ground water samples collected from monitoring well MW17: benzene (11 to 14 μ g/l), ethylbenzene (3.8 to 20 μ g/l), toluene (3 μ g/l), and total xylenes (20 μ g/l). Methylene chloride was detected in ground water samples collected from monitoring wells MW17, MW30, and MW32. Detection of this compound is considered to be indicative of laboratory contamination because methylene chloride was also detected at a similar concentration in an associated trip blank (Table 5-13). Figure 5-19 shows the distribution of benzene in Site 5 - Former FTA ground water.

5.4.4.2 Semivolatile Organic Compounds. SVOCs were not detected in RI ground water samples collected from monitoring wells MW17, MW30, and MW32.

5.4.4.3 Total Petroleum Hydrocarbons and Lead. TPH were not detected in RI ground water samples collected from monitoring wells MW30 and MW32 (Table 5-14). TPH were detected at concentrations ranging from 444 to 1,000 µg/l in ground water samples collected from monitoring well MW17. Lead was not detected in RI ground water samples collected from monitoring wells MW17, MW30, and MW32.

5.4.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 5 - Former FTA to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that

TABLE 5-13 Volatile Organic Compounds Detected in Site 5 - Forner FTA Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

1							Concert	Concentrations in micrograms per liter	ograms per i	iter						
Location Res. (tifter	Location Date Sampled	Laboratory	Chlorobergene Chloroform	Chloroform	1,2-Dichlon	ne 1,3-Dictionbenzene 1,4-Dictionbenzene	1,4-Dichlorobenzene	Methlyene Chloride	ļį.	enzene	Ethylbenzene	Toluene	m-Xylene	o-Xylene	p-Xylene	Total Xylens
MW17	54/51.5	SC(S-S)	N D	Ω.	g.	QN	Q.		2	<u> </u>	50	m	OZ.	2	81	1
21.841V	i.	24 /- 7 (14200-0001-5A	ν Ω	2	2	ОХ	8	Q	2	: . =	3.8	ON.		1		Q.
MWIT		11 / 14 / 11595H-0003-SA	CN	2	В	QN	QX	QN	· Q	23	: ₹	QX	. 1	1		Q.
MW30	7 13/45	98816.	6N	2	ΩN	(N	QN	-	QN	Đ.	5	ND	Q.	2	S	1
NEMEN	FP1,551 8	8 227/95 H4124-0002-SA	2	2	02	2	ON		9	2	: : <u>2</u> :	ΩN				Q
MW30	11/14/95	11/14/95 115954-0004-SA	ND	ND	S I	0x	Q	2	. 8	Q.	S.	Ę	· · · · · · · · · · · · · · · · · · ·		 ! !	Q N
2FWIN	56/11/2	£0816	QN	S	ON.	QX	QN	.2 (1)	QN	SO	QN	Q.Z	ND (UZ)	8	ND (UZ)	1
MWNZ	4/22/95	114124-0003-SA	CX	N Q	N.	2	Q.N.	2	2	, O	, S	ΩŽ				Q
SEVIN	36/41/1:	115954-0007-SA	QN	ND	ND	ON.	Q	£	. 5	, ON	ND	QN	: 1 :		; ; , !	Ŋ
		MCI.	100	8	PLX)	0,79	7.5	ĸ	ur.	ιc	200	1,000	V.	NA	NA	10,000
	- 1	Cleanup Level	831	NA	600	6470	75	NA	5	5	700	1,000	N.	NA	NA	10,000

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N.D. met detected.
ICF - inchloreethy lene.
1-) - met reparted.
MCL = meximum contaminant level.
N.A. - meximum and level.

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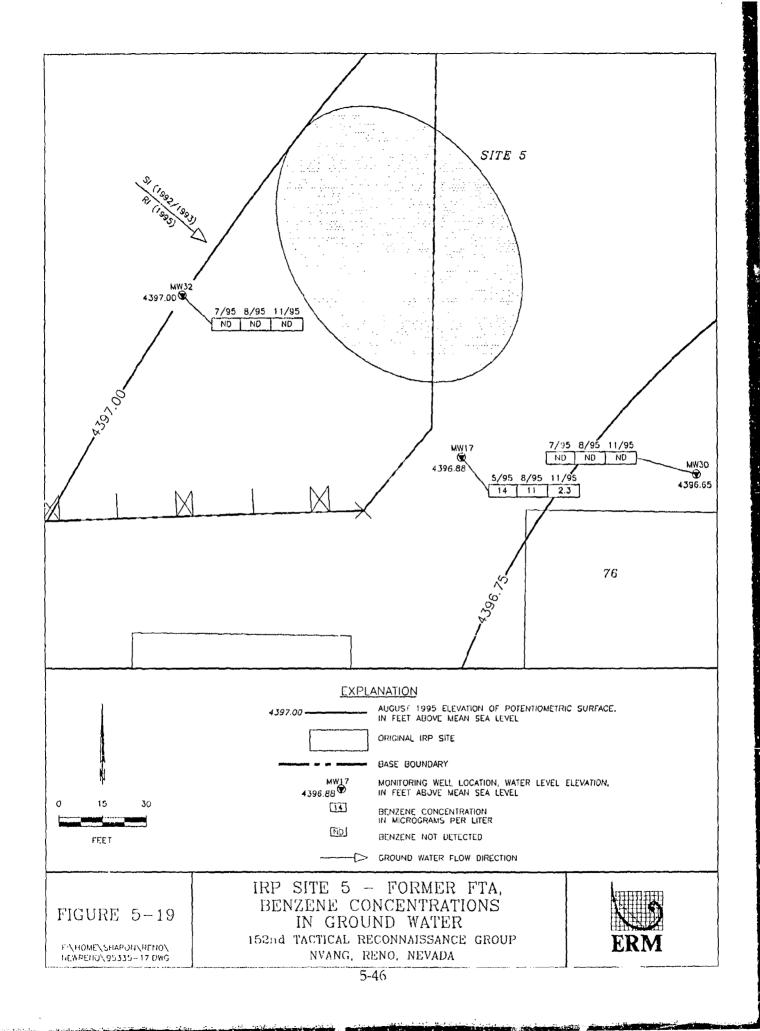
TABLE 5-14
Total Petroleum Hydrocarbons Detected in Site 5 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, µg/l
MW17	5/12/95	88079	444
MW17	8/24/95	114200-0001-SA	1,000
MW17	11/14/95	115954-0003-SA	ND
MW30	5/25/95	88875	ND
MW30	8/22/95	114124-0002-SA	ND
MW30	11/14/95	115954-0004-SA	ND
MW32	5/25/95	88868	ND
MW32	8/22/95	114124-0003-SA	ND
MW32	11/14/95	115954-0007-SA	ND

TPH = total petroleum hydrocarbons

 $\mu g/l = micrograms per liter$

ND = not detected



may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

- Ground water: benzene; and
- Soil: TPH.

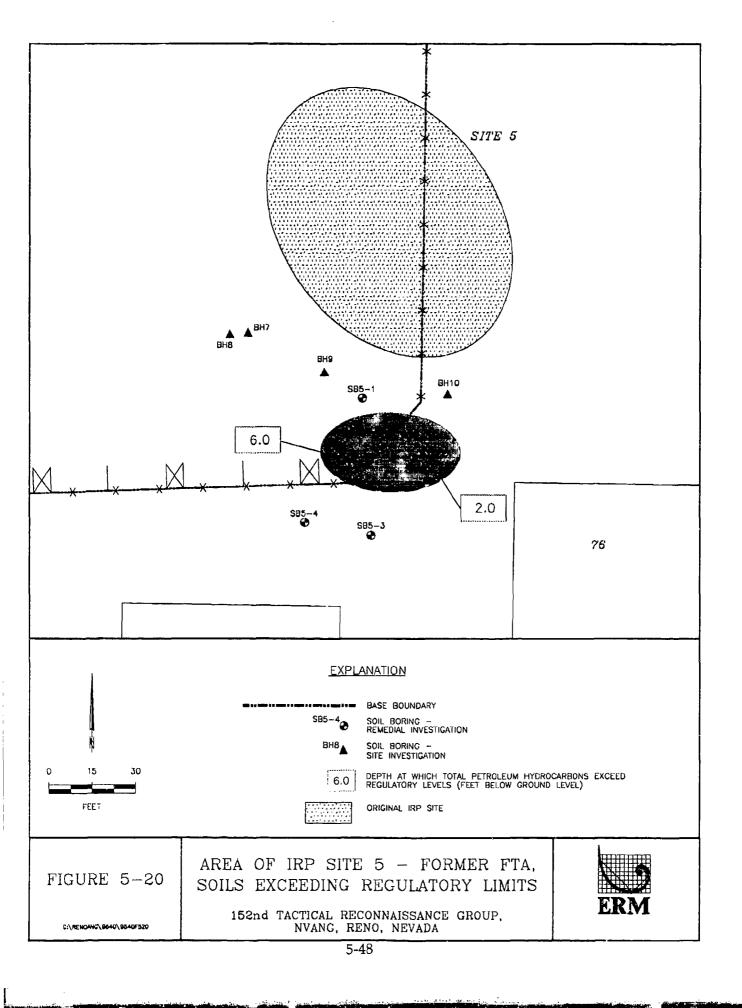
Figure 5-20 depicts the approximate area where TPH in soils exceeds cleanup standards. This figure also shows the collection depths of those soil samples in which TPH exceeded cleanup standards. In general, the area of soils exceeding cleanup standards is relatively small and is in the immediate vicinity of soil borings SB5-2 and BH6. The ground surface at soil boring SB5-2 is approximately 3 to 4 feet higher in elevation than the ground surface at soil boring BH6. Therefore, the soil horizon containing TPH impacted soil is approximately horizontal within the area depicted on Figure 5-20.

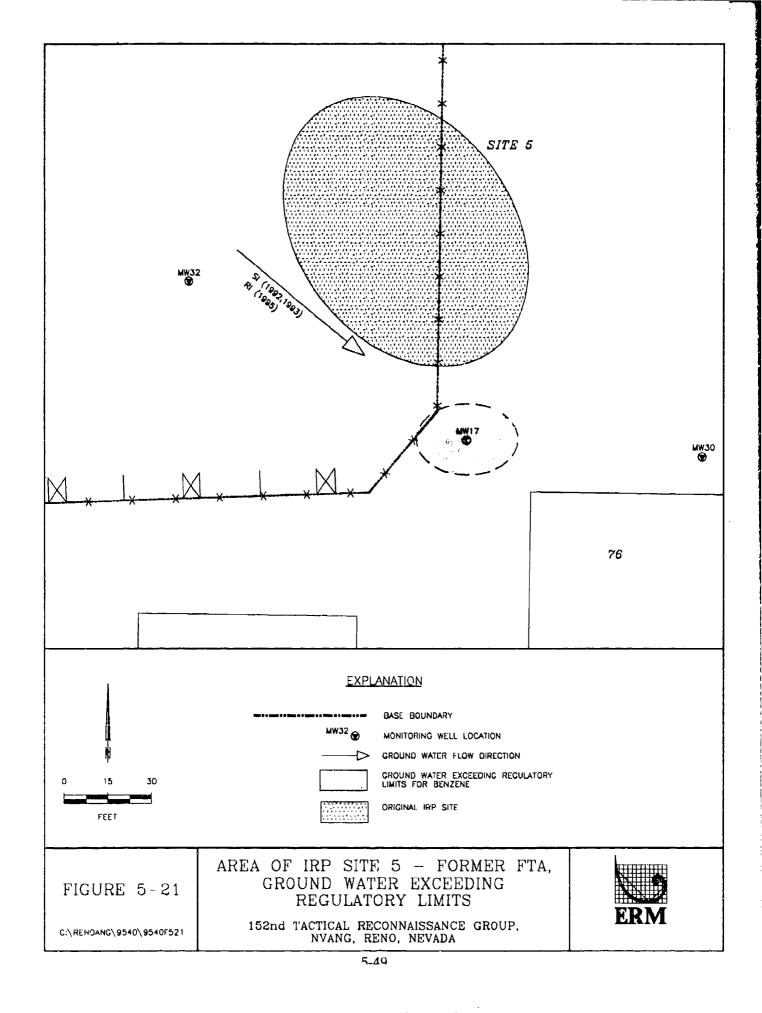
The area of TPH impacted soil is located in the immediate vicinity of monitoring well MW17 and potentially provides a continuing source of petroleum-derived hydrocarbons to Site 5 - Former FTA ground water. This soil area also lies partially on Airport property and partially on the NVANG Base. It is recommended that an FS be performed for Site 5 - Former FTA soils based on the potential threat to ground water quality posed by TPH and the fact that a portion of the TPH impacted soils lies off-Base.

Figure 5-21 depicts the approximate area where ground water exceeds cleanup standards with respect to benzene. This area is confined to the immediate vicinity of monitoring well MW17. Concentrations of benzene have remained relatively unchanged since the SI (15 μ g/l in samples collected in March 1992 and 14 μ g/l in samples collected in May 1995). Because an area of soil adjacent to monitoring well MW17 appears to be the source of benzene to ground water, remedial activities performed for Site 5 - Former FTA soils is likely to reduce benzene concentrations in ground water. However, since a portion of the estimated extent of benzene impacted ground water lies off-Base, it is recommended that a FS also be performed for Site 5 - Former FTA ground water.

5.5 Site 7 - POL Storage Area

The following is a description of RI activities at IRP Site 7 - POL Storage Area, including geologic and hydrologic investigation results,





screening results, soil and ground water investigation results, and conclusions.

5.5.1 Geologic and Hydrologic Investigation Results

The subsurface encountered at Site 7 - POL Storage Area is comprised of fill material, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-22 was constructed using lithologic data from monitoring wells MW10, MW06, MW07, MW31, MW23, and MW24.

Up to 4 feet of fill material is present at Site 7 - POL Storage Area. The underlying silty clay reaches a maximum thickness of 8 feet in monitoring well MW10. In monitoring well MW23, the silty clay contains a lens of poorly graded sand. Generally, the silty clay is underlain by well-graded, sandy gravel that contains a lens of poorly graded sand between monitoring wells MW31 and MW23. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 7 - POL Storage Area monitoring wells were evaluated and the ground water flow direction was determined to be to the southeast during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A. Confined aquifer conditions were encountered during drilling of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-22 illustrates that water level elevations measured in monitoring wells at the site are approximately 2 to 6 feet above the base of the confining unit. Unconfined aquifer conditions were encountered in the gravel backfill within the UST excavation area. At this location, the confining silty clay layer has been removed during the excavation process.

5.5.2 Screening Results

A surface geophysical survey using a magnetometer and ground penetrating radar was used to locate the surface extent of four USTs and associated piping at IRP Site 7 - POL Storage Area, and the extent of the excavated area around the tanks. The approximate area of the

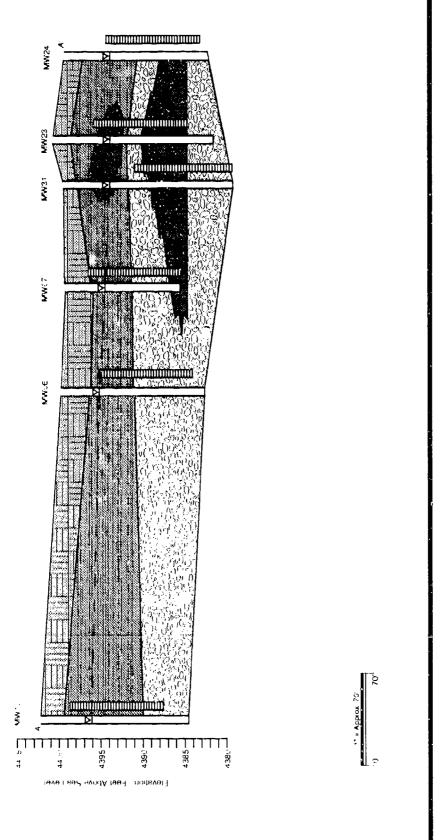
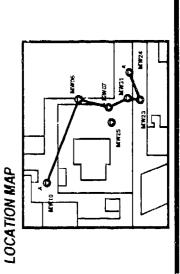
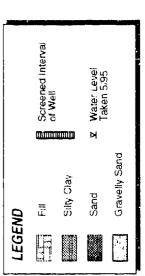


Figure 5-22
IRP Site 7-Pol Storage Area
Geological Cross Section
152nd Tactical Reconnaissance
Group, NVANG Base

ERM-West, Inc. 7 6001.41.WDK/08.01.95





excavation was mapped and is presented on all of the illustrations presented in this section.

The survey confirmed that the USTs were 10 feet in diameter and that approximately 3 feet of horizontal clearance exist between adjacent tanks. A subsurface electric power line was detected within the eastern end of the excavation, approximately 15 feet from the eastern end of the USTs. Presence of the power line provided a major constraint for drilling within the excavation.

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.5.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB7-1 through SB7-12 located at Site 7 - POL Storage Area. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-15 summarizes the soil sampling program for chemical analysis.

Complete analytical results for soil samples collected from soil borings drilled at Site 7 - POL Storage Area are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-16 through 5-18. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB7-3-5.5 denotes the soil sample collected at soil boring SB7-3 at a depth of 5.5 to 6.0 feet bgs.

5.5.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB7-1 through SB7-12: acetone (15 to 547 $\mu g/kg$), benzene (12 to 2,800 $\mu g/kg$), chloroform (9 to 12 $\mu g/kg$), ethylbenzene (30 to 37,900 $\mu g/kg$), methylene chloride (15 to 34 $\mu g/kg$), toluene (5 to 20,100 $\mu g/kg$), TCE (2 $\mu g/kg$), and xylenes (11 to 258,000 $\mu g/kg$). In general, the highest VOC concentrations in Site 7 - POL Storage Area soil samples were detected in sample SB7-7-1.5 (Table 5-16 and Figure 5-23). Figure 5-24 shows the areal and vertical distribution of benzene in soils.

<u>5.5.3.2 Semivolatile Organic Compounds.</u> SVOCs were detected in soil samples collected from soil borings SB7-1, SB7-2, SB7-3, SB7-5, SB7-7,

TABLE 5-15 Summary of Site 7 - POL Storage Area Soil and Ground Water Sample Collection Activities

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
	SB7-1	5/19/95	2, 3.5, 5.5, 7.5
Ĭ	SB7-2	5/19/95	1.5, 3.5, 5.5, 7.5
	SB7-3	5/19/95	1.5, 3.5, 5.5, 7.5
Ī	SB7-4	5/19/95	1.5, 3.5, 5.5, 7.5
Ī	SB7-5	5/20/95	1.5, 3.5, 5.5, 7.5
	SB7-6	5/20/95	1.5#, 3.5, 5.5#
Soil	SB7-7	5/20/95	1.5, 3.5***, 5.5, 7.5
Ĭ	SB7-8	5/20/95	3, 5.5, 7.5***
Ī	SB7-9	5/23/95	1.5, 3.5, 5.5, 7.5, 8.0***
<u> </u>	SU7-10	5/23/95	0.5, 4, 5.5, 7
Ī	SU7-11	5/23/95	1.5, 3.5, 5.5, 6.5***
Ţ	SB7-12	5/22/95	1.5, 3.5, 5.5, 7.5
	MW06	5/13/95 8/24/95 11/16/95	NA
	MW07	5/13/95 8/24/95 11/16/95	NA
)	MW10	5/14/95 8/23/95 11/16/95	NA
Ground Water	MW23	5/14/95 8/22/95 11/15/95	NA
	MW24	5/25/95 7/13/95** 8/22/95 11/15/95	NA
	MW25	5/25/95 8/25/95 11/17/95	NA
	мwзі	5/25/95 8/24/95 11/16/95	NA
	T-1	NA	NΛ
Product	T-2	NA	NΛ
•	T-3 (extraction well)	NA	NΛ
	T-4	8/25/1995 11/17/95	NA

^{• --} Sample depth listed is at the top of a 6-Inch sample interval
•• -- Resampling date
•• -- Field gas chromatograph only

NA - not applicable

[#] No field gas chromatograph analysis performed

TABLE 5-16
Volatile Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Recomaissance Group, NVANG, Reno, Nevada

							J	proentrations in	Concentrations in micrograms per kilogram	week			,		
Location	Date Scopfed	Leburatory	Acetune	Chlorobenzene	Chleroform	Methylene Orloride	2-Hexanone	2-Butanone	4-Methyl- 2- pentenone	ğ	ħ	Benzere	Bhytherzene	Toluene	Xylenes (rote!)
5871.33	56.61.5	9H-88	\$	5	9.6	2	2	2	ez ez	2	2	12 (1)	30 (1)	Š	110
1.55	8 2 v	##-	9	9	2	9	9	5	Ş	2	2	8	3,800	12.0)	9,300 (E)
1.73	\$ 10.46	88445	2	9	91	15 (JB)	9	2	2	2	αN	24 (1)	ድ	Q	280
5.53	±6 61. S	#8	9	2	2	2	9	2	2	2	2	2.800 (E)	4.400 (D)	QN	(0) 000 01
20.00	5 19.45	₩	35	8	9	2	9	9	2	2	20	ន	94	ž	1000
10.00	56.61 5	8448	92.	9	9	ያ	2	9	 9 	2	Ę	8	1,200 (D)	6.5	3,000 (D)
575	5 .10 /05	88-489	윤	2	9	ð	9	8	8	2	£	1,400	2300	£	5,300
\$67.298	\$ 61.5		<u>基</u>	: - <u>9</u> -	9	 8		9	9	2	2	2	£	2	5,560
5803-55	\$6.61.5	88435	<u>1</u> 21			្ត ខ្	8	8	8	2	5	2	995	2	4,010
587.355	5 10 45	15,158	110	9	: : <u>8</u>	9	:	9	2	2	2	2	1,180	5	5,140
\$87-3-5	56. 61. 5	.: 75 188		9 :	2	. 2	9	9.	2	2	2	2	QX	2	65
587+35	\$ 14.45	92798	! ፵	, cy	· 8	្ង	8	9	8	\ 5	5	2	£	2	5
SET + 75	5.19.95	i		02	: 2	: 2	9.	2	2	2	2	2	2	2	2
SEL+738	56. 61. S		<u>8</u>	QN	9	9		2	5	2	2	2	2	2	2
SB7-5-3.5	5 20 85		101	2	. 8	2	2	2	2	2	2	2	2	2	2
580-5-55	\$7.50 \$4.50	•	₽	, ov	γ 9	9	: 2	9	2	2	2	114	091	426	4,300
587.57.5	5 20 95		<u>9</u>	9	! ይ	2		- 및 :	2	5	2	1,310	00671	20,100	62,100
587-4-18	. Si		ន :	: 9	9	. 2	2	 	9	2	2	5	ΩN	2	2
587-4-35	5 K &	16588	Ŀŝ	2	8	9	ક	<u>.</u> 8	2	2	2	2	2	2	2
SB7-4-5.5	5 A S	88542	₫.	2	2	2	9	2	2	5	2	2	Ą	8	5
SB7:7:15	\$ H	88543	9	9	N Q	Š.	Q.	S	2	9	ę	2,430	37,900	101	258,000
587.753	5,30.45	16:58	e:	ç,	9 9	#	2	Š	9	S	2	r	715	CN	2,530
SB: 7-5	5 05.5	\$6368	d X	Q.	8	8	8	8	Q	Š	2	061	650	NO.	1,570
587-8-3	5.30.45	2H288	5	92	δ	R	2	9	Ö	2	Q	Q	495	QN	1,660
SB**55	5.B %		٤	9	8	5	2	5	Ω	2	8	S	QV.	QN	n
587-8-55	5. 30. 45			Ð.	9	8	2	5	Š	8	2	2	S	Ş	5
587-4-15	56. EL. S	S8645	51	9	9.	ا اع	2	Ď	Š	ę	2	2	S.	Ð	Ð
SB7-4-3 5	5 23 %	¥ 38	ж	9	<u>8</u>	8	Š	8	S	2	2	2	Q	Q.	Q.Z
SBT-4-35	5 23 %	(4.88.	th.	9	2	2	8	8	QX OX	8	2	2	Q	Ø	17
587-10-40	5/23.45	88448	181	8 2	8	ě	8	2	9	Q.	2	2	Q	Q.	Б
537-10-55	5238	65/40	101	QV	8	9	Ð	ß	2	2	2	8	Ð	2	143
\$87-10-55	5.13.45	38,50	 	<u>ا</u>	8 8	Ď	8	2	S	ā	2	8	Q	2	25
SB~10-70	8,11,8	88651	참:	δ.	2	5	Ş	2	2	2	2	2	Ð	S	92
537:11-15	5/13/45	88.52	152	6	9	5	5	2	Ş	2	2	9	811	£	3,070
587-1135	5 23.95	98653	92	α <u>ν</u> -	9 9	Ð	2	2	9	2	9	2	517	ð	1,130
537 11-5.5	8.83	3885	S	δ.	Š	S	Q	Q.	6	Q.	2	645	7.740	5,650	38,500
587-12-3.5	5,12/95	SS41	2	Š.	8	£	Q	2	O.	ξ.	2	Q.	QX	Q.	Š
S87-12-55	5.52.95	C7-788	8	Ω	δ.	Q.	Q	NO OX	QΥ	£	9	2	Q	ξ.	6X
587-12-75	5.17.45	BS643	QV	ND	ΩN	ΩN	5 CV	CN	CN	CV.	5 D	8	QX	QN	Ę
SB7-12-75*	56, 22/5	£5,47	ΩN	ΩN	ΩN	2	2	6	es es	65	2	2	QV	Đ.	θÑ
		Cleanup Level	350,060	100,000	900.9	8	17,500	200,002	280,000	8	95	98	20,000	100,000	1,000,000

= duplicare PCE = retrachloneuty/ene TCE = trichlonetty/ene ND = not detected

TABLE 5-17
Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Recornaissance Group, NVANG, Reno, Necada

Location					-					_				_		
dentiner	Date Sampled	Laboratory Number	Acenaphthene	Antiracene	Benzo(a) anthracene	Benzo(2) pyrene	Benzo(b) fluoranthene	Benzo(g.h.i) perylene	Berzo(k) fluoranthene	Cartazole	Chrysene	Dibenzofuran	1,2-Dictiloro- benzene	1,3-Dichloro- benzene	1,4-Dichloro- benzene	2,4-Dichlor phenoi
i p	88,46, 2		2	<u>ج</u>	4	5	ON N	2	Q.V.	Ş	Z	2	Q	Q	ON	2
00-1-00	1 20/07/1	F. 3	135 C		() SS ()	mozt	16001	G	8	£	240 D	840	윤	2	Q.	S
CC-1-795		[5		5	5	2	2	2	2	2	e e	Ð	£
0 /-1-/6	2/20/4/	CHO.	: :	- e e e	ا ا	ا ا	0.025	130	210 m	81 E	370 (I)	QN	Q	Q.	2	e
567-2-35	\$ /07 /0	2 t 3	(A) (C)	5.5	5.65))) (3 3 3 0		0.40	95	3,900	300	£	£	2	2
562-15	\$ /07/6	ì	0.00	3, 3	} } !	24.7	3	E 201	55.5	169	Ę.	20 CE	2	2	2	Z
SB7-2-5.5	5/20/99	91188	(D 69	5071	9	: 24	010	0.81	R		300	3	2	Ş	2	£
SB7-2-7 5	3/30/5	64488	85 (J)		6 8	0.21	(D)	() () ()	(<u>.</u> (2)	3 2	000	9	2	5	1	5
SB7-3-3.5	5/20/96	7.75	2	2	2	9	ا اج	<u>و</u>	2	N.	N.	S.	2	2 9	2 5	
587-3-5.5	5/20/99	88435	2	9.	2	P.	QX	S.	당	2	2	ΩN	Q.	Q.		
SB7-3-5 G	68/06/5	88.3%	GN	2	5	No.	2	2	2	ß	QN	QV	5	9	2	
2 1 2 LB2	1 80,007	1278		2	. GZ	ON.	2	 2	5	2	£	5	Q.	ΩN	£	2
207-707	00/05/3	55,38	į	1	5	2	QN.	2	9.	2	2	£	£	Q.N	2	물 물
7	2.00.00	00000	?	9	! !	9	9	5	5	2	2	2	5	ND	2	2
. c-1-795	K/07/c	ر اور	2. £	2'5	; ;					2	S	2	£	QN	£	8
587-1-7.5	\$/97./A	2 . S		ا ورا		1] - -	15		5	S	2	£	ΩN	g	S.
000	66/17/6	, 9588		2:! - -	2 !	9			9	5	5	5	Ę	2	£	S
587-5-5.5	5/21/99	88288	2.! 2.!	2,!	2.5			و اج		9 5			S	2	2	2
SB7-5-7.5	5/21/99	68589	2	<u>ا</u> ج	QN	?! ! !	2					9	9	2	5	5
SB7-0-1.5	5/21/99	06588	Ω.	ا 2	δ. :	9	5	6	2	2	OZ !	2	2 5	5 5	2 2	9 5
587-6-3.5	5/21/99	16538	5	9	2	2	ا ا	5	2		2	2	2	2		
SB7-6-5.5	5/21/99	86392	ΩN	٠. وي	2	2	N.	ON	O.V.	Ē	剧	<u> </u>	DN DN	QV.	ON I	5 1
SB7-7-15	5/11/60	88593	2	2	2	ν	e E	2	2	2	<u>Q</u>	Q	2	S	2	2
SB7-7-5 5	5/11/60	16588	22	QN.		<u> </u> 2	N.	8	2	2	Q	2	2	S.	Q.	2
27-7-7	8/1/5	565.85	2	2	, 2		S	GN.	2	2	Q	QZ .	2	2	2	2
SB7.8.3	00/16/5	79788	GX.	2	! ! !	2	2	<u> </u>	9	2	2	ΩX	£	2	2	Z
CRISSS	08/17/5	50588	Ş	102	2	, 0	ex.	92	S	2	Q	9	ON	운 	2	운!
CBC-8-5-5-	06/16/5	66588	þ	2	9	2	S.	 兄 	2	2	g	2	Q.	2	2	2
CRIBIA	2/11/00) } }	9	Ź	102	200	<u> </u>	9	2	£	2	2	g	S	2	2
CHTGRAS	80/FC/S	68646	9	QN	QX	2	5	5	2	見	£	Q.	QN	2	呈	2
	00/ FC/3	25.52	: ! 5	5	5	2	QN.	2	S	2	2	S	g	QN	R	E
CB7 10 102	20/15/6	58648	į		i da	9	ON.	 2 	S	2	£	2	g	ΩN	S	2
0 101 100	200	- C0700	1			5	5	15		2	2	£	Q.	g	<u>R</u>	Z
267-10-13	27.74/32	6600	9 5	5		9		 9	2	2	£	2	QZ.	£	QX	S
5 -07-795	64/15/	15750	9	15	1	5	 - 	5	5	2	2	£	S	2	g	S
55/-10-/ 0	6/14/0	10000			:	5	ļ.		Q.	2	Ş	£	S	2	DN.	Z
50,-11-70		75000	9.9	; !	!	 - -	2	2	2	8	g	£	S	£	R	2
. 5511-755	80.00		! !	15	5	:5	5	9	2	2	S	g	Q	2	g	g
50,11-705	18/17/	56641	 - -	9	2	! !	2	2	2	2	S	2	£	Q.	8	2
0.000		5759	165	5	5	9	62	2	S	2	S	2	ND	2	Q.	2
0.01.7	7/7/2/2	2000		102	: } 5	2	Q.	02	ON	2	62	2	ę	2	R	2
587-12-75-	5/33/8	788	22	2	: ! !!	2	122	2	2	2	ΩN	S	Q	ΩN	Ω Ω	2
	2117	-													004.0	

TABLE 5-17
Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Date Sampled	Laboratory Number	Dibenzo (a,h) anthracene	Fluorene	Fluoranthene	Indeno (1,2,3-cd) pyrene	2-Methyl- naphthalene	4-Methylphenol	Naphthalene	Phenanthrene	Рупете	1,2,4-Trichloro- benzene	bis(2 - Ethylhexyl) phathalate
SB7-1-3.5 5/20/99	88443	QX.	2	6N	웃	2	S	2	£	Ę	QN	NO NO
	. 11188	2	194 :		(D)	1400	Ω	740	S	089	QN	£
	88+15	ΩN	51.0	O.V.		1±3 @	Ę2	S	(C) #3	720	ND I	ON
	88.446	ON	96	! 0 89	150 C	810	 	300 (1)	710	026	QN	QN
	288	. 86	9700	 88 1	2300	110	2	110 @	5,900	(Q) 006'6	QN	Q.
,	88.48	⊝2.	1.100	ا ا	240 (1)	1,500	2	740	770	1,400	e.	500
	67.8	2	99	! : €	150.0	1,700	2	06 	220	83	S	£
;	E.58	22	; 2	- 02	1 62	3.1	NO	47.6	GN.	Q.	QX	QN
	88435	! ! QZ	, ,	: 2	2	1,010	ON ON	2	£	S	CN.	Đ.
	56.188	2	2	QX	· · ·	2	2	2	QN.	Ę	£	ΩN
i	88437	i ez	2	e.	9	ę	2 -	<u>6</u>		ę	QZ	δ.
:	88438		! !			Z	ON.	 2	2	£	QN	S
i	1 25.78	 2 		! ! 5		2	QX	2	ez Pa	£	£	2
	OFFSS	 	5	GZ 	1 12 1	2	S	£	S	S	Q	£
:	29588	 2 	9	GZ.	CX	2	£	 g	2	ĸ	2	£
	88588	2	!	2		2	5.	Ę	2	£	QN	Đ.
:	1 68288		9	5	- F	533	<u> </u> 2	 2 	2	g	£	GZ.
:	658	2	5	9	9	QX	 - 2	£	P.	£	Q.	£
;	88391	 2 	ይ !	2	2	2	62	£	62	£	g	QN.
ļ	88.592	: 2 ::2	: :2 !	- QX	2	2	2	 22 	S	£	£	QN
	56-33	2		- CX	- 2	2	: 	Z	<u>Q</u> 2	Š	Q.	S
į	70588	 5	9	- CZ	GN	2	2	2	S	Z	2	Z
SB7775 5/21/99	88595	2	!	l qx	d.	629	2	<u></u>	 全	S	S	CN
ļ	28597	12	2	2	2	2	 8.	£	2	£	2	QN
!	88598	 2	i 2	2	ez	 	2	2	S	£	2	ND
SR7-8-5 5' 5/21/99	66598	 2 -	2	2		 2 	S	£	2	£	QΝ	CN.
İ	886.5	2	2	 2 		 - -	2	S	£	Q	QN	Ę.
	989	2	2		 62 	! ! 2 !	Z	£	£	£	QZ	Ç.
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1	88652	2	2	e.	2	8	2	551	- PE	ξ	£	QV
ļ	88653	2	2	2	2	2	 	 長	S	£	QN	ON
Ì.	15988	2	2	兄	2	1260	S	326	2	£	QZ	ON
÷	11-988	QX	 9.	S.	2	S	QX	6Z	Q	QN	QN	ON
:	88642	QV	; 2	Q.	S	2	 Q	2	S	g	Q.	ΩN
:	88643	 2 	ا ا	2	9	2	2	QX	S.	Ð	Ę	QN
SB7-12-7 3* 5/33/99	15988	2	į E	- P.	QN	g	2 - -	Q.	£	£	QX	QN

• = duplicate ND = not detected

TABLE 5-18
Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

FINAL

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB7-1-3.5	05/19/95	88443	7.6
SB7-1-5.5	05/19/95	88444	1,000
SB7-1-7.5	05/19/95	88445	24
SB7-2-3.5	05/19/95	88446	560
SB7-2-3.5*	05/19/95	88447	210
SB7-2-5.5	05/19/95	88448	380
SB7-2-7.5	05/19/95	88449	440
SB7-3-3.5	05/19/95	88434	222
SB7-3-5.5	05/19/95	88435	184
SB7-3-5.5*	05/19/95	88436	141
SB7-3-7.5	05/19/95	88437	10.8
SB7-4-3.5	05/19/95	88438	ND
SB7-4-5.5	05/19/95	88439	ND
SB7-4-7.5	05/19/95	88440	ND
SB7-5-3.5	05/20/95	88587	ND
SB7-5-5.5	05/20/95	88588	306
SB7-5-7.5	05/20/95	88589	1,010
SB7-6-1.5	05/20/95	88590	ND
SB7-6-3.5	05/20/95	88591	4.31
SB7 - 6-5.5	05/20/95	88592	ND
SB7-7-1.5	05/20/95	88593	5,520
SB7-7-5.5	05/20/95	88594	144
SB7-7-7.5	05/20/95	88595	93
		Cleanup Level	210

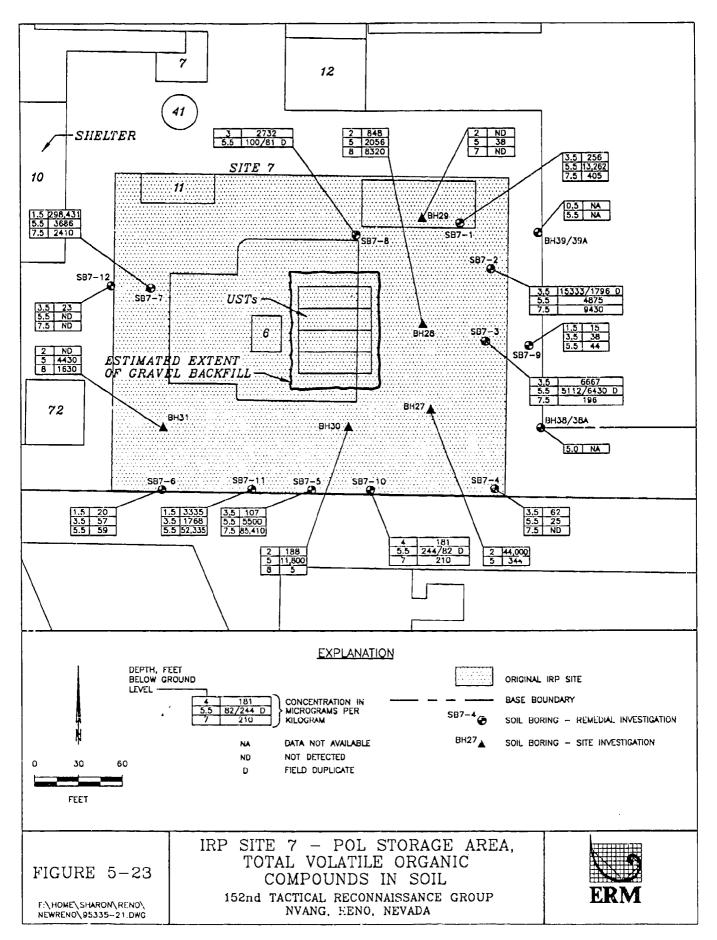
TABLE 5-18

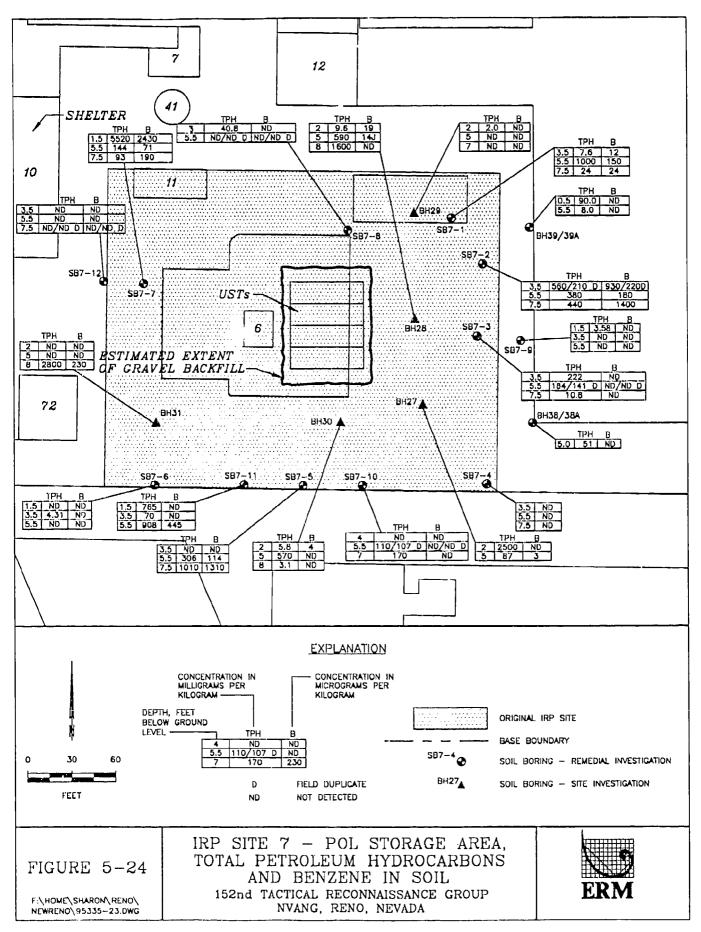
FINAL

Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Soil 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB7-8-3	05/20/95	88597	ND
SB7-8-5.5	05/20/95	88598	ND
S37-8-5.5*	05/20/95	88599	ND
SB7-9-1.5	05/23/95	88645	3.58
SB7-9-3.5	05/23/95	88646	ND
SB7-9-5.5	05/23/95	88647	ND
SB7-10-4.0	05/23/95	88648	ND
SB7-10-5.5	05/23/95	88649	110
SB7-10-5.5*	05/23/95	88650	107
SB7-10-7.0	05/23/95	88651	170
SB7-11-1.5	05/23/95	88652	765
SB7-11.3.5	05/23/95	88653	70
SB7-11-5.5	05/23/95	88654	908
SB7-12-3.5	05/22/95	88641	ND
SB7-12-5.5	05/22/95	88642	ND
SB7-12-7.5	05/22/95	88643	ND
SB7-12-7.5*	05/22/95	88644	ND
		Cleanup Level	210

* = duplicate mg/kg = milligrams per kilograms TPH = total petroleum hydrocarbons ND = not detected





SB7-9, and SB7-11. The following SVOCs were detected in one or more soil samples collected from these soil borings: 2-methylnaphthalene (110 to 4,290 μg/kg), acenaphthene (69 to 190 μg/kg), anthracene (100 to 840 μg/kg), benzo(a)anthracene (220 to 2,800 μg/kg), benzo(a)pyrene (120 to 2,400 μg/kg), benzo(b)fluoranthene (100 to 3,300 μg/kg), benzo(g,h,i)perylene (52 to 2,000), bis(2-ethylhexyl)phthalate (50 μg/kg), carbazole (47 to 940 μg/kg), chrysene (240 to 3,900 μg/kg), dibenzo(a,h)anthracene (70 to 890 μg/kg), dibenzofuran (54 to 300 μg/kg), fluorene (68 to 6,200), fluoranthene (51 to 280 μg/kg), indeno(1,2,3-cd)pyrene (65 to 2,300 μg/kg), naphthalene (110 to 1,540 μg/kg), phenanthrene (64 to 5,900 μg/kg), pyrene (72 to 9,900 μg/kg). In general, the highest SVOC concentrations in Site 7 - POL Storage Area soil samples were detected in duplicate soil sample SB7-2-3.5 (Table 5-17 and Figure 5-25). Figures 5-26A and 5-26B show the areal and vertical distribution of selected SVOCs in soils.

<u>5.5.3.3 Total Petroleum Hydrocarbons.</u> TPH were detected in soil samples collected from soil borings SB7-1 through SB7-3 and SB7-5 through SB7-11 at concentrations ranging from 3.58 to 5,520 mg/kg (Table 5-18 and Figure 5-25).

5.5.4 Ground Water Investigation Results

Ground water samples were collected from Site 7 - POL Storage Area in May 1995 from monitoring wells MW06, MW07, MW10, MW23, MW24, MW25, and MW31. Monitoring well MW24 was resampled in July 1995 for VOC analysis due to quality control problems encountered by the analytical laboratory. Monitoring well MW31 was also scheduled for resampling but was inadvertently omitted from the July 1995 monitoring event. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-15 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 7 - POL Storage Area are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analyses are presented in Tables 5-19 through 5-21. Section 2.3.3 presents a summary of ground water chemical quality data collected from Site 7 - POL Storage Area monitoring wells prior to the RI.

Volatile Organic Compounds Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Recomaissance Group, NVANG, Reno, Nevada

		L						Concentrate	AR IT THE TE	Concentrations in micrograms per lite	<u>d</u>						
Location	Date Sampled	Laboratory Number	Chlorobenzene	Chloroform	12-Dehlordenzere	12-Dethousenzere 13-Dethoroberzere 1,4-Dethoroberzen	1,4-Dichterobenzene	Meltiyere Orloride	Ē	Benzene	Ethylbenzene	Totoene	m-Xylene	o-Xylene	p-Xylene	Total Xylenes	Total Xylenes 1,1-Dichloroethane
MWOK	\$ 51.5	7.82	£	9	2	9	Đ.	6	5	Æ	•	ā	ĝ	£	Q	£	Q
NEWOR*	\$ 0.5	. 2. X	9	9	9	: · ይ	8	ę g	· 8	X 1	. . .	2	2	· · ·	52	,	2
MMOR	8/24/95	7576WHW2111	9	ይ	2	; . 2	: . 2	2	2	! ≰ :	1 4	2	1	1	·	12	S
MMin	11, 16 '95	11, 16 '95 115447488A-5A	2	문 ,	: 2	! ! ! !	: · ·	8	B	. 11	: ! <u>sc</u>	į <u>2</u>	,	. '	! . ! .	32	QN
MMOT	5.13.05	ENCENT.	5	Ş	2	2	8	8	2	Æ	D#1	F	2	ጽ	20	,	Q.
MM		8/24/96 114203-0007-SA	!	8	: <u>p</u>	9	: : : :	2	8	ं द	3	5			: '	Ę	9
MINIT		11/2h/95 :150074007-5A	₽	! ይ	2	9	2	2	2	្ន	: z	5	ı .			æ	12
MM10	¥.	12188	ğ	8	9	B	2	ð	2	ğ	9	₽	ę	2	2	g	g
01 NUN 10	. \$5.51 1.32	8-23/95 114163-0005-5A		, 8	. 6	2	! ! ! !	: 9	. 8	2	1 2		1		[['	2	£
otman	11/16 95	11/16 95 115w274010-5A	Ę	2	2	9	9	9	. 2	2	: 2	2		'	 '	ę,	S
CMIN	50.27.5	4512k	g	8	9	ē	9	ę	8	9	9	9	Š.	9	9	ę	2
MM	\$5/22/& 	N.227/95 H4124-0008-SA	2	8 :	. 2	. 2	Q	8	: 8	: 2	. Q	2	. 1	: '	, ·	Đ	£
MW23		11.15 W 1159547013-5A	2	2	· 2	: 6	: 9	: : 2	: . 2	2	£	. 8	-		!	£	£
Minist	77.137.45	4120		£	2	Ð	S		2	2	g	ğ	£	8	Q.	2	2
FZMJW	1	3	2	2	e N	. 5	9	8	: 2	' 2	9	Ę				2	ę
VIW24	85.81711	11715.95 1159844N12-SA	2	B	2	£		8	2	2	: - ይ	E				2	£
NEWZS	5/13/45	20098	£	5	2	В	2	5	8	ž	2	,	Ð	អ	57.1	'	£
NWS	. 87 . 84 . 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8	٠ چ	9	8	ይ :	: ፡ ይ :	2	2	2	1001	Ð	2		t	,	p ;	
NW25	56/21/11	AS-CHARACTER SPACE IN	2		9	9	B	, 2	9	De. [£	£		,	,	→	_ }
MW31	8/24/45	8/24/v5 11430H-005-5A	2	B	8	Ð	ě	5 E	B	£	Q.	8	,	1	ı	8	9
NOW31"	8/24 45	8724 of INANOMOS-SA	: ₽ !	2	9 :		8	. 5	9		2	9		,	,	2	8
MW31	11/16/95	11/16/95 115007-0008-5A	: : : : :	: : 2	· 2	8	! ! ይ :	9	9	g g	Q.	QV	_		'	ē	Ð
1	* * * * * * * * * * * * * * * * * * *	F.	9	ě	2	9	£	S.	2	240	2	940	ı		,	00	ę
ż	* *! &	8 25 95 11423147004-5A	MA-SA ND	5	· 9	: ይ	! ! ! ይ	2	원		E	2,000			' '	ω ς 1	9
Į.	\$ 21.11	11,17 % 11609-003-5A	. 2	В	5	2	Ω.	: <u>9</u>	ON.	. 6.	5.5	7.6		1	! 1	æ	Ð
		MC	i i	ર્સ	W.	(M)	ĸ	5	۰,	er,	(F)	1,000	Ϋ́	ž	¥	10,000	¥
		Cleanup Level	100	¥,	HJ.	(44)	٤	NA A	۰,	le,	UK.	1,000	ž	ž	Ϋ́	10,000	Y.

** chiphane
NE - mot detected
TE = motherediviere
TE = mot reported
WEL = maximum contaminant level
NA - mot available

TABLE 5-20
Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

					Concentrations in micrograms per liter	úстодгальs per li	ter		
Location Identifier	Date Sampled	Laboratory Number	1,2-Dichlorobenzene	2,4-Dimethy!- phenol	2-Methyl-naphtbalene Phenanthrene	Phenanthrene	Naphthalene	bis (2-Ethylbexyl)- phthalate	Di-n-octyl phthalate
MW06	05/13/95	06088	ΩN	θX	QN	ON	ΩX	Q	δN
.90MJN	36/£1/50	16088	9	ON.	ON.	Ω.	QN	QN	QN
NTW06	08/54/95	114200-0003-SA	O.N.	Ð.	8.	8	Ĉ.	2	Đ.
NTW06	56/91/11	115997-0009-SA	ON	O.	ΩN	Ω	QN	15	Q.
NOWOT	. 56/13/95	88083	O.N.	Q.	51 · · ·	5	z	61	S.
NRW07	08/24/95	114200-0007-SA	ΩN	ď	QN	δ	13	15	Ω
NEWO7	11/26/95	115997-0007-SA	ND	QN	19	S.	15	32	Q.
NEW10	05/14/95	F2158	ON.	S.	Š.	9.	8	N.	Q
NEW10	08/23/95	114163-0006-SA	9.	8	ΩN	9	2	δ.	6
MW10	11/16/95	115997-0003-SA	ND	QN	Q.	Ŋ	QN	Q.	ON
MW23	05/14/95	FS126	QN	S.	QN	S	0.N	Đ.	S
MW	56/22/80	114124-0008-SA	O.	2	Ω.	9	8	₽ [']	2
SEWIN	11/15/95	115954-0013-SA	ΩN	άχ	Ω	S.	S	S.	S
NDW24	05/25/95	. 538873	QN.	CN.	N Q	2	N.	2	Q
FZMJK	08/22/95	114124-004-SA	ON.	8	ΩN	8	S.	2	Ð
MW24	11/15/95	115954-0012-SA	ND	ΩN	ΩN	δ.	ON	ΩN	ND
SCWIN	56/11/50	26083	ΩN	ä	15	9	я	#	£
STANK	56/52/80	114231-0001-SA	ъ. Б	8 8	0 +	1 01 	x	#	£
SCWIN	11/17/95	11e019-0002-SA	ΩN	12	28	Đ.	24	89	NO
MW31	05/25/95	0.2883	Ö.	8	6	8	N.	2	es.
አፕላ31	08/24/95	114200-0005-SA	S.	O.N.	ΩN	ON.	O.	QV	N
MW31	56/17/80	114200-0006-5A	В	8	₽ 2	2	8	62	Ę.
MW31	11/16/95	115997-000R-SA	D.	δ.	β	S	Ω.	Q.	CN
ا ت	08/22/95	114231-0903-SA	В	<u>8</u>	8 5.	9.	8	1,600	8
7	08/22/95	114231-0004-SA	Ω.	8	63	S.	53	1,700	*
I	11,17,95	116019-0003-SA	Ω	ΩN	O.N.	δ.	ON	200	Ω.
		MCL	600	NA	NA	NA	NA	9	NA
		Cleanup Level	0.59	7007	1.400	1,400	1,400	9	700

= duplicate

ND = not detected

(--) = not reported

MCL = maximum contaminant level

NA = not available

TABLE 5-21

Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Ground Water

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

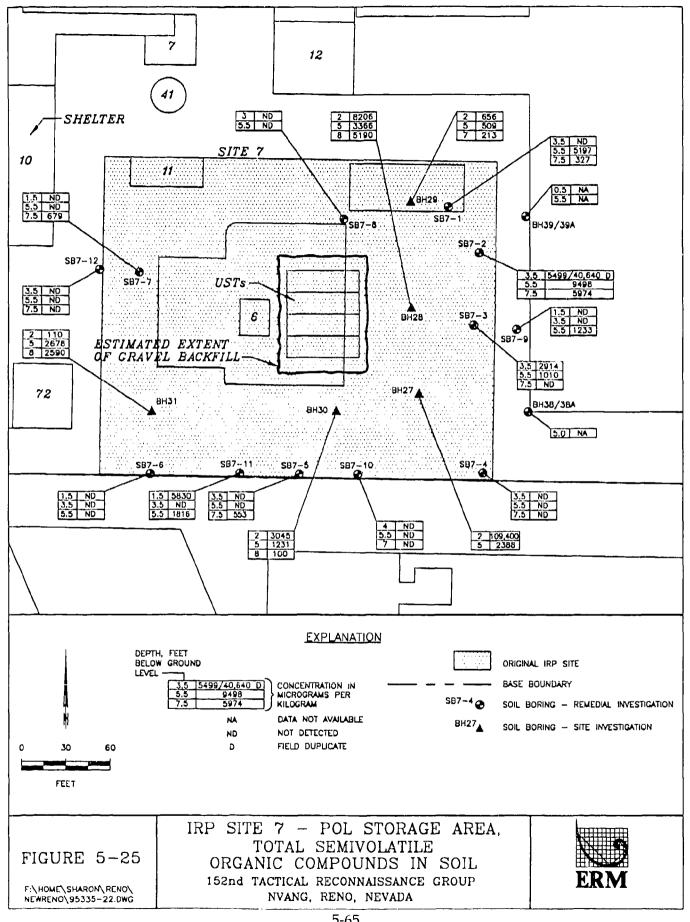
Location Identifier	Date Sampled	Laboratory Number	TPH, μg/l
MW06	5/13/95	88090	ND
MW06*	5/13/95	88091	ND
MW06	8/24/95	114200-0003-SA	7, 500
MW06	11/16/95	115997-0009-SA	11,000
MW07	5/13/95	88093	1,340
MW07	8/24/95	114200-0007-SA	38,000
MW07	11/26/95	115997-0007-SA	21,000
MW10	5/14/95	88124	ND
MW10	8/23/95	114163-0006-SA	ND
MW10	11/16/95	115997-0003-SA	ND
MW23	5/14/95	88126	433
MW23	8/22/95	114124-0008-SA	ND
MW23	11/15/95	115954-0013-SA	ND
MW24	5/25/95	88873	ND
MW24	8/22/95	114124-0004-SA	ND
MW24	11/15/95	115954-0012-SA	ND
MW25	5/13/95	88092	4,490
MW25	8/25/95	114231-0001-SA	17,000
MW25	11/17/95	116019-0002-SA	28,000
MW31	5/25/95	88870	ND
MW31	8/24/95	114200-0005-SA	930
MW31*	8/24/95	114200-0006-SA	730
MW31	11/16/95	115997-0008-SA	77 0
T-4	8/25/95	114231-0003-SA	75,000
T-4*	8/25/95	114231-0004-SA	46,000
T-4	11/17/95	116019-0003-SA	6,700

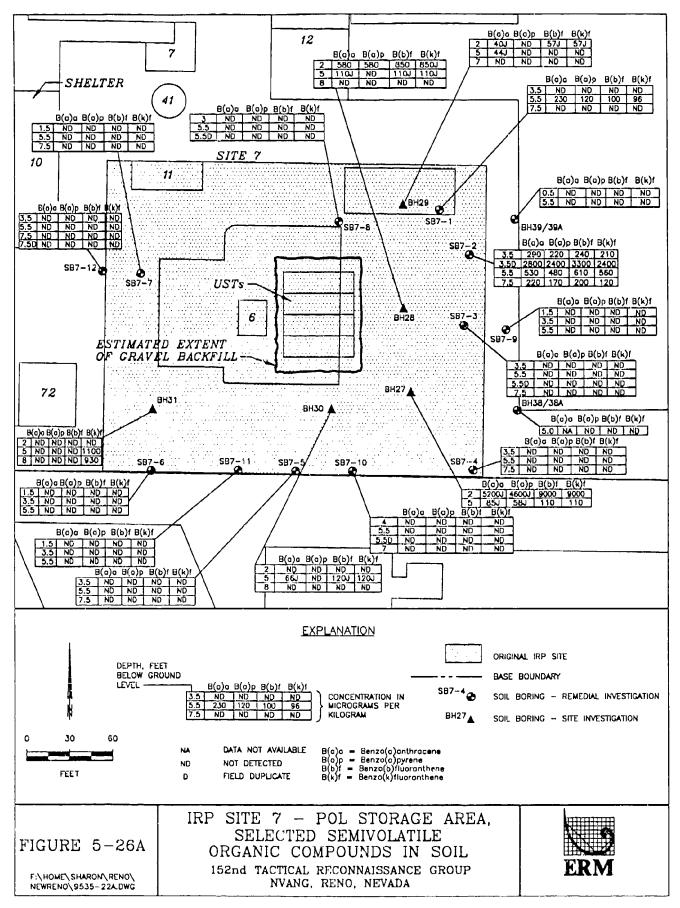
^{* =} duplicate

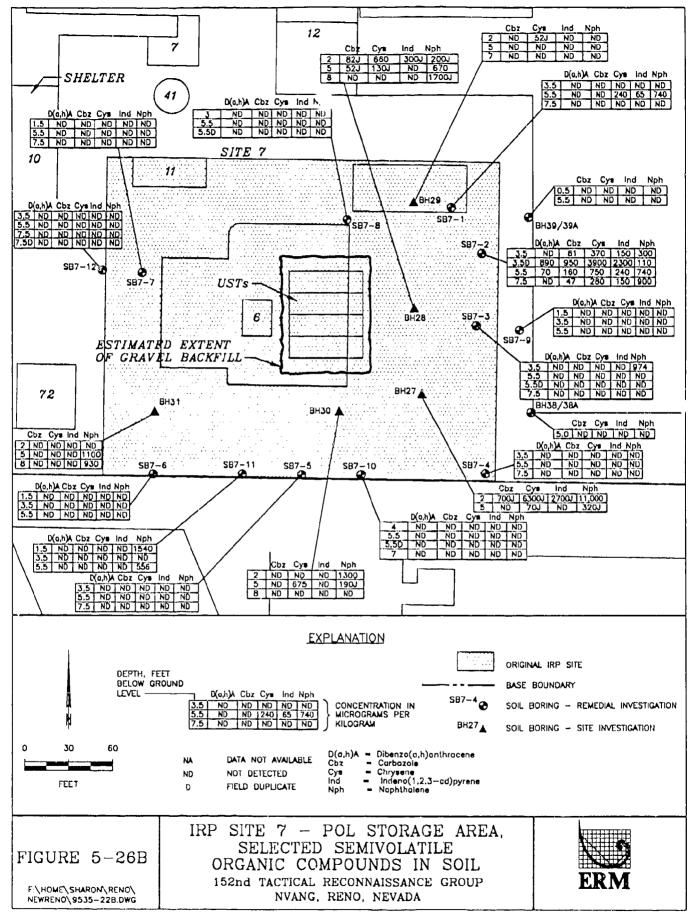
TPH = total petroleum hydrocarbons

 $\mu g/1$ ~ micrograms per liter

ND = not detected







5.5.4.1 Volatile Organic Compounds. Several VOCs were detected in RI ground water samples collected from monitoring wells MW06, MW07, MW25, and product monitoring well T-4: benzene (15 to 1,300 μ g/l), ethylbenzene (9 to 370 μ g/l), toluene (9 to 2,000 μ g/l), total xylenes (16 to 1,500 μ g/l), 1,1-Dicloroethane (1.2 μ g/l), (Table 5-19). Figure 5-27 shows the distribution of benzene and toluene in Site 7 - POL Storage Area ground water. Methylene chloride was detected in ground water samples collected from monitoring wells MW24 and MW31. Detection of this compound is considered indicative of laboratory contamination.

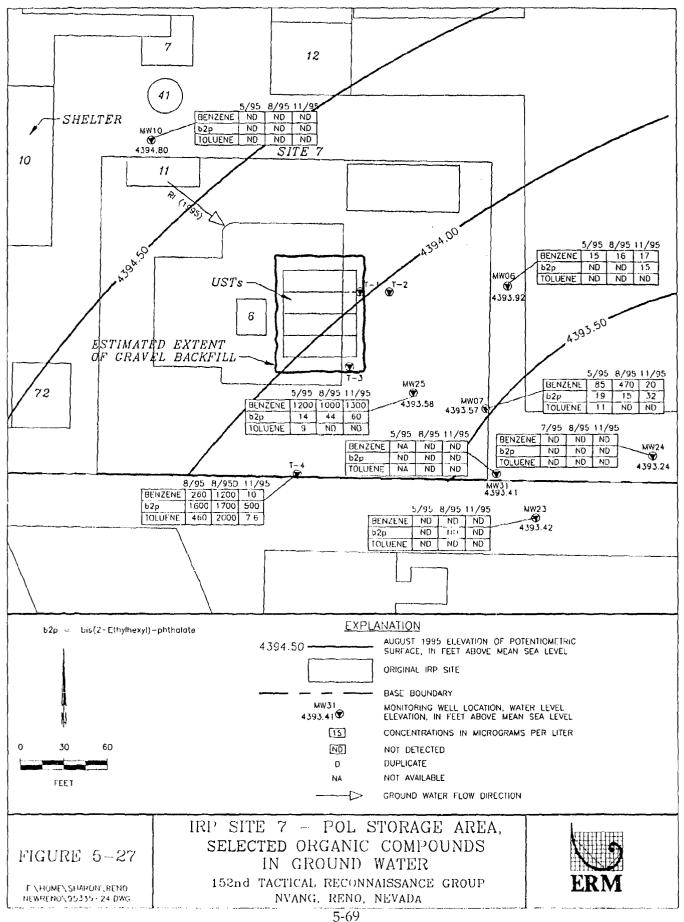
5.5.4.2 Semivolatile Organic Compounds. SVOCs were detected in RI ground water samples collected from monitoring wells MW07 and MW25: 2,4-dimethylphenol (12 μ g/l), 2-methylnaphthalene (18 to 63 μ g/l), bis(2-ethylhexyl)phthalate (14 to 1,700 μ g/l), and naphthalene (22 to 53 μ g/l), (Table 5-20). Figure 5-27 shows the distribution of bis(2-ethylhexyl)phthalate in Site 7 - POL Storage Area ground water.

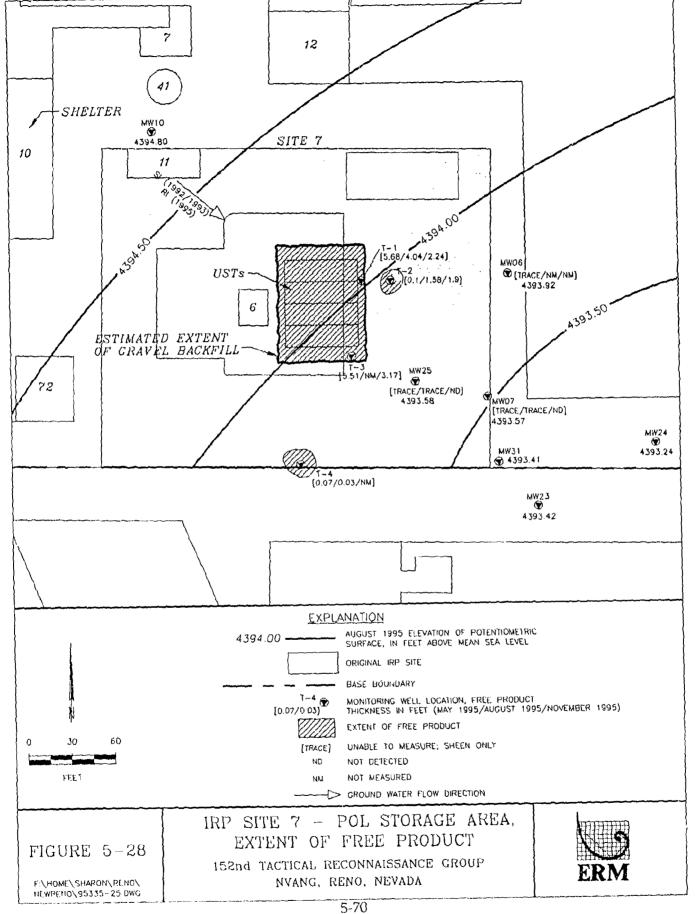
5.5.4.3 Total Petroleum Hydrocarbons and Lead. TPH were detected in RI ground water samples collected from monitoring wells MW07, MW23, MW25, and product recovery well T-4 at concentrations ranging from 433 to 75,000 $\mu g/l$ (Table 5-21). Lead was not detected in RI ground water samples.

5.5.4.4 RI Product Thickness and Characterization. Floating product thickness was measured in Site 7 - POL Storage Area wells during RI field activities. Figure 5-28 presents the locations at which floating product was detected and thickness of product encountered during late May 1995, August 1995, and November 1995. Product thickness was measured using an interface probe. Approximately 6 feet of floating product was measured in product monitoring well T-1 and product recovery well T-3 that were completed in the excavation backfill. ERM estimates that approximately 13,500 gallons of floating product existed within the UST excavation area as of mid-August 1995. This estimate was based on data collected during product removal operations in late August 1995, described in Section 5.5.4.5.

Approximately 0.1 foot (1.2 inches) of floating product was also measured in monitoring well T-2, located approximately 15 feet east of the surface extent of gravel backfill in the UST excavation. Approximately 0.07 foot (0.8 inches) of floating product was also measured in product monitoring well T-3, located approximately 70 feet south of the surface extent of gravel backfill.

Product samples were collected in May 1995 from product monitoring well T-4 and product recovery well T-3. Visual examination of both samples indicated that product was highly weathered in appearance. The samples were submitted for fuel fingerprint analysis using EPA





Method 3510/8000. The results of the analysis suggested that both samples were comprised of weathered JP-4 fuel.

5.5.4.5 Product Removal Operations. A product recovery program was initiated at Site 7 - POL Storage Area after the discovery of 6 feet of free product in the gravel backfill in the UST excavation. The thickness of free product encountered during RI field work was more than anticipated based on review of previous data at the site. ANG/CEVR contracted with ERM to conduct a product removal program to supplement the existing product removal system previously installed at recovery well T-3 in June 1995.

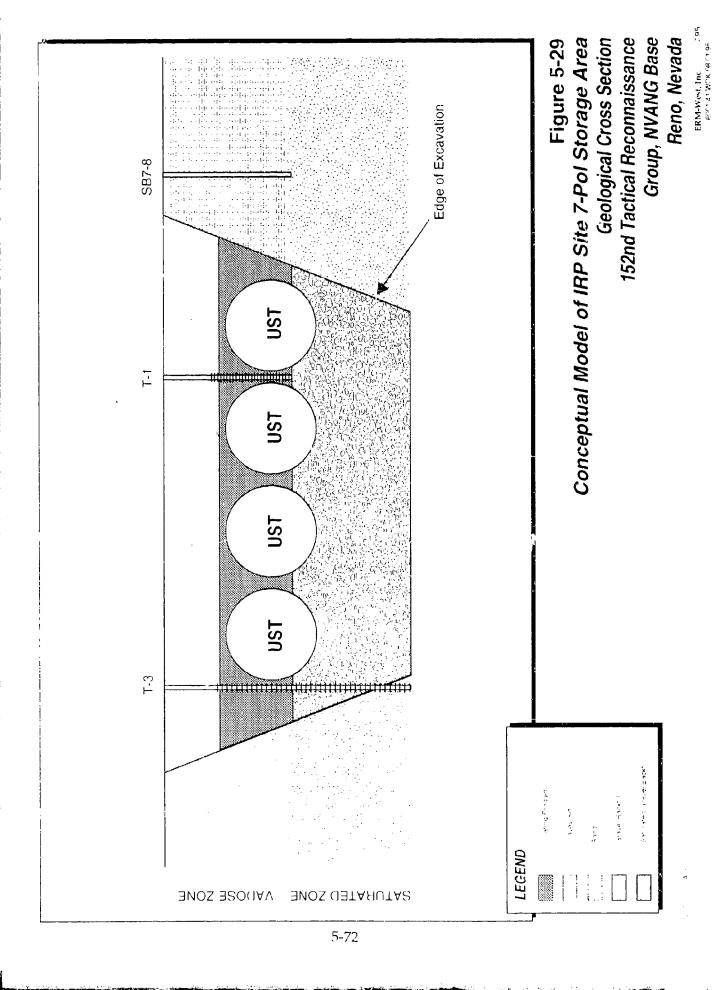
Three additional product recovery wells (T-5 through T-7) were installed in the gravel backfill area (Figure 4-3) on August 21 and 22, 1995. Product recovery operations, comprised of a vacuum pump attached to a tank truck, were used to extract free product from the additional recovery wells. Product removal operations continued during a 10-day period during August 23 and September 7, 1995. During this period, approximately 10,000 gallons of product were removed from the gravel backfill. The observed product thickness in recovery well T-5 decreased from 2.73 to 0.60 feet; product thickness in recovery well T-6 decreased from 5.3 to 1.1 feet; and product thickness in recovery well T-7 decreased from 5.3 to 1.5 feet. A comparison of product recovery data for recovery wells T-6 and T-7 with the quantity of product removed suggests that 1 foot of product thickness in the gravel backfill is roughly equivalent to 2,500 gallons of free product.

ERM prepared a letter report outlining the details of the recovery well installation and product recovery program. This report is included in Appendix A.

5.5.5 Conclusions

5.5.5.1 Floating Product. A significant quantity of floating product was discovered during RI investigations at Site 7 - POL Storage Area. The product is located within the gravel backfill in the UST excavation area. Review of data collected during both the SI and RI suggest geologic conditions surrounding the UST excavation area has minimized the migration of floating product from the excavation. Figure 5-29 presents a conceptual model of floating product distribution in the immediate vicinity of the excavation. The excavation breaches the confining layer at Site 7 - POL Storage Area creating a "window" into the shallow ground water unit at the site.

Based on available product thickness data collected prior to the start of the product removal program, it appears that some of the floating



product within the excavation was in direct contact with coarser grained sediments of the shallow ground water zone at Site 7 - POL Storage Area. However, the majority of the floating product was surrounded by the relatively fine-grained soils of the vadose zone. These soils have crea' d impediment to product flow outward from the excavation.

Despite the direct contact between ground water and product, it appears that minimal amounts of floating product have migrated away from the excavation area (Figure 5-28). It is likely that the free product detected at product monitoring well T-2 originates from the UST in the excavation area. Review of SI and RI data also suggests that relatively high concentrations of VOCs and SVOCs associated with dissolved phase product are migrating from the excavation area to downgradient monitoring wells MW25 and MW7.

It is recommended that an FS be performed for free product removal from the excavation backfill in order to remove this source of petroleum hydrocarbons to Site 7 - POL Storage Area ground water.

One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with surface spill event. The information used to identify this area of free product as associated with a separate spill event is as follows:

- Elevated soil concentrations for TPH were detected in the soils in the vadose zone at the monitoring well T-4 location; and
- No evidence of the presence of free product was detected during the drilling of SI soil boring BH30.

Product thickness measured in product monitoring well T-4 was approximately 0.8 inches in May and June 1994. When converted to actual thickness on the water table using the four-times-less approach (i.e., divide by four), the floating product does not currently exceed the NDEP removal-action guideline of 0.5-inch actual thickness. A periodic product thickness monitoring program and mitigation by bailing should be instituted. A similar program was successful in significantly reducing free product thickness at monitoring well MW07.

5.5.5.2 Soil and Ground Water. ERM compared the results of SI and RI soil and ground water chemical analyses for Site 7 - POL Storage Area to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas

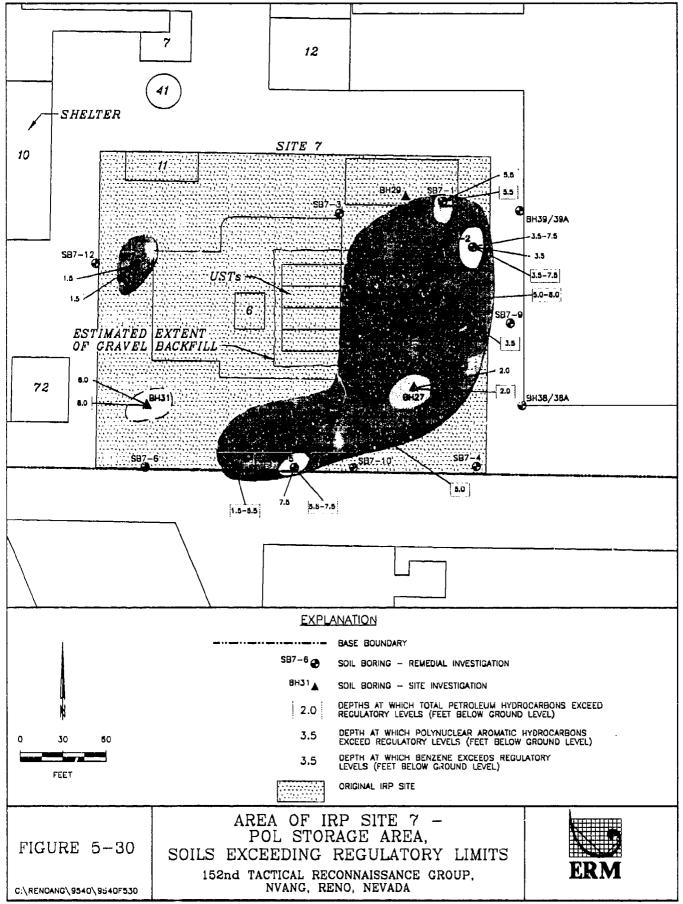
of ground water and soils that may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

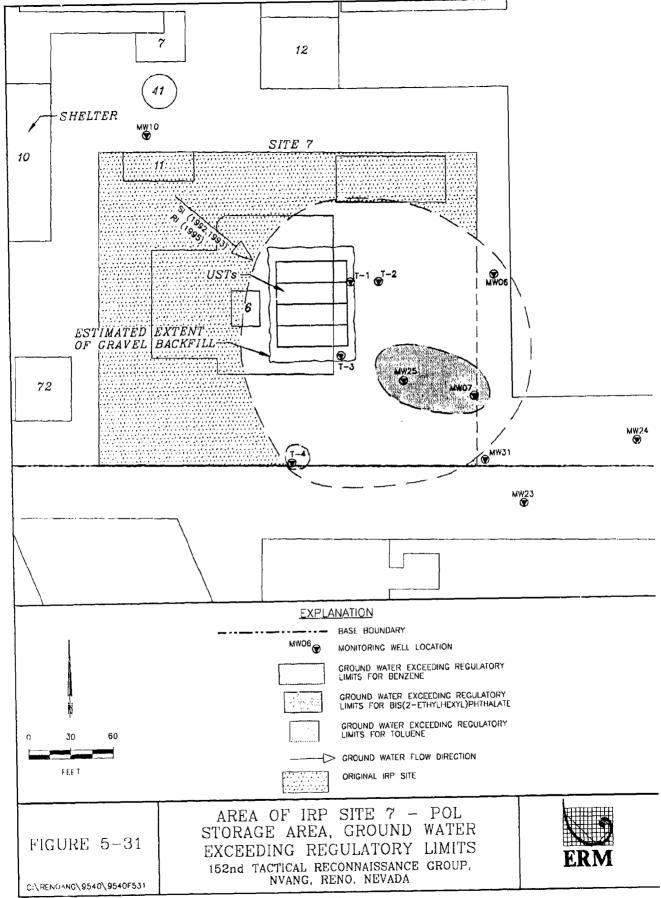
- Ground water: benzene, toluene, and bis(2-ethylhexyl)phthalate;
 and
- Soil: TPH, benzene, and several PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbozole, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene].

Figure 5-30 depicts the approximate area where soil exceeded cleanup standards. This figure also shows the collection depths of those soil samples in which soils exceeded the respective standards. Review of the areal and vertical distributions of TPH, benzene, and PAHs suggests that these distributions are consistent with the product release history at Site 7 - POL Storage Area (Section 2.3.2.2). Several JP-4 spills have occurred in the Site 7 - POL Storage Area, most of which are reported to have been flushed into soil and gravel areas surrounding the refueling stand. Because the presence of elevated concentrations of petroleum hydrocarbons in Site 7 - POL Storage Area soils poses a threat to ground water quality, it is recommended that a FS be performed.

Figure 5-31 depicts the approximate area where ground water exceeds cleanup standards with respect to benzene, toluene, and bis(2-ethylhexyl)phthalate. The area of ground water impacted by benzene comprises the eastern half of Site 7 - POL Storage Area. This area may actually extend off-Base in the vicinity of the Airport's control tower. However, it is not anticipated that the benzene impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution.

The approximate area of ground water impacted by bis(2-ethylhexyl)phthalate appears to be confined to the vicinity of monitoring wells MW07, MW25, and product monitoring well T-4 (Figure 5-31). This compound has been historically detected in ground water samples collected from monitoring well MW07 at concentrations exceeding the cleanup standard. Although bis(2-ethylhexyl)phthalate is known as a common laboratory contaminant, no information is available to suggest that laboratory contamination is responsible for detection of this compound in monitoring wells MW07, MW25, and product monitoring well T-4 samples. The approximate area of ground water impacted by toluene appears to be confined in the immediate vicinity of product monitoring well T-4 (Figure 5-31).





Based on review of Site 7 - POL Storage Area ground water data, it is recommended that a FS be performed for Site 7 ground water.

5.6 Site 14 - Oil Water Separator

The following is a description of RI activities at IRP Site 14 - OWS, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

5.5.1 Geologic and Hydrologic Investigation Results

The subsurface at Site 14 - OWS is comprised of fill material, pale-gray to olive-brown sandy silt, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand; and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-32 was constructed using lithologic data from monitoring wells MW13 and MW12 from Site 13 and monitoring wells MW15 and MW09 from Site 14 - OWS.

Approximately 3 feet of fill material are present across Site 14 - OWS with the exception of monitoring well MW13, which has about 10 feet. The underlying silty clay reaches a maximum thickness of about 4 feet and grades into sandy silt between monitoring wells MW15 and MW09. Generally, the silt and silty clay are underlain by well-graded sandy gravel that contains a lens of poorly graded sand on the west end of the cross section. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 14 - OWS monitoring wells were evaluated and the ground water flow direction was determined to be to the east during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A. Unconfined aquifer conditions were encountered during drilling of the RI soil borings and SI monitoring wells at this site (Figure 5-32). Water levels in monitoring wells at Site 14 - OWS are immediately below the surficial silty clay layer that functions as the confining unit at other IRP sites at the NVANG Base.

5.6.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.6.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB14-1 through SB14-3 and SB14-5 located at Site 14 - OWS. Soil samples were not collected from soil boring SB14-4 due to the presence of a subsurface concrete slab. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-22 summarizes the soil sampling program for chemical analysis.

Analytical results for soil samples collected from soil borings drilled at Site 14 - OWS are available from the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-23 through 5-25. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB14-3-5.5 denotes the soil sample collected at soil boring SB14-3 at a depth of 5.5 to 6.0 feet bgs.

5.6.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB14-1 through SB14-3 and SB14-5: 2-hexanone (32 $\mu g/kg$), 4-methyl-2-pentanone (18 $\mu g/kg$), acetone (42 to 383 $\mu g/kg$), methylene chloride (11 to 62 $\mu g/kg$), and xylenes (12 to 2,300 $\mu g/kg$). In general, the highest VOC concentrations in Site 14 - OWS soil samples were detected in sample SB14-3-5.5 (Table 5-23 and Figure 5-33).

5.6.3.2 Semivolatile Organic Compounds. Two SVOCs were detected in sample SB14-3-5.5: 2-methylnaphthalene (4,010 μ g/kg) and naphthalene (4,750 μ g/kg) (Table 5-24 and Figure 5-33).

5.6.3.3 Total Petroleum Hydrocarbons. TPH were detected in only two samples collected from soil boring SB14-3 at concentrations ranging from 169 to 2,500 mg/kg (Table 5-25 and Figure 5-34).

TABLE 5-22

Summary of Site 14 - OWS Soil and Ground Water Sample Collection Activities 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
	SB14-1	5/24/95	3.5, 4**, 6**
	SB14-2	5/24/95	3.5, 5.5, 7.5**
Soil	SB14-3	5/24/95	5.5, 7.5
	SB14-4	5/24/95	UTS
	SB14-5	5/25/95	3.5, 5.5, 7.5**, 9
Ground Water	MW15	5/12/95 8/21/95 11/14/95	۸۷.
	MW18	5/12/95 8/21/95 11/13/95	NA

^{* =} Sample depth listed is at the top of a θ -inch sample interval

 $UTS = Unable \ to \ sample; encountered \ subsurface \ obstruction$

NA = not applicable

^{** =} Field gas chromatograph only

FINAL

TABLE 5-23
Volatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

							ָלָ ק		The state of the s	i					
Location	Date Sampled	Laboratory Number	Acetone	Acetone Chlorobenzene	Chloroform	Methylene Chloride	2-Hevanone	2-Butanone	4-Methyl- 2- pentanone	PCE	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
SB14-1.3.5	12. 12. 12.	SSTOS	38.3	GN	GN.	62	2	S	QN	2	£	UND	Ę.	δ.	DN.
56.1-F105		. 69288	[2]	. S	2	æ	2	QN	Q	Q	QN	QN	<u>8</u>	£	<u>Q</u>
CRIA 7.35	, 150 E	Ess	1 12	· : 2	QN	1.	. E	Q.	81	S	QN	QN	ē.	Q.	g
CBIACASS				. 2	2	ž	QN.	QX	ΩN	Q.	ON	QN	ę.	<u>9</u>	Q.
2014-202		SS	<u>.</u>	· ! 9	G	2	DN	ON.	. QN	Q	QN	QN	<u>8</u>	E.	2300
00-0-4100	, 10 T. 1.] [· ! 5		5	9	2	QN	8	QN	Q	쉳	S	105
6 /6-+100	5 19 19 19 19 19 19 19 19 19 19 19 19 19	1 1 2] ;	9 5		: 5	9	92	. QX	2	QN	2	2	Ω.	ដ
S814-2-55	G :			9. 9	2	9		. S	· : §	2	· 2	Q	- Q .	2	Ð
Cent-198			† 5 <u>.</u>	9. 9 .	9 9] =	· - 2	9.	· · 2	2	8	QN	QN	QN.	ND
3.0-100		Close January 350 (MX)	350,000	-	100%	Ę	17.50	200.000	2%0,000	200	300	300	70,000	100,000	1,000,000

^{• =} duplicate PCE = tetrachloroethylene TCE = trichloroethylene ND = not detected

TABLE 5-24
Semivolatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

		1						Concentration	Concentrations in micrograms per kilogram	ns per kilogra	ğ					
Location Identifier	Date Sampled	Laboratory Number	Acenaphthere Ant	Anthracene	Benzo(a) anthrawne	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g.h.i) perylene	Benzork) fluoranthene	Carbazole	Chrysene	Dibenzofuran	1,2-Dichloro- benzene	1,3-Dichloro- berzene	1,4-Dichloro- benzene	2,4-Dichloro- phenol
SB14-1-3.5	5 25 45	88788	S.	ĝ	S	2	2	Ω	8	9.	8	Q.	S.	92	ON	QN.
SB14-2-35	5 25 65	SKITE	S	9	CN.	QN	GN.	8	S	8	Ω.	8	8	2	Q N	2
SB14-2-3 5•	ر ال ال	0 CE 38	ON.	GN.	Û.	QN	S.	9	9.	2	8	2	8	2	QN ON	2
58:4:3:5	ទ	ii ž	C.	Ω.	d.	GN	ΩN	ON	O.	Q.	ON	2	QX	· 兄	N 0X	2.
58:4-3-5	r. 13.		O.N.	Q.V.	a N	S.	Q.N.	S	S.	2	0	2	: 2	9	N OX	QX
58:4:3:73	٠ ١ ١	i Z	NΩ	QN	QN	QN.	QN	S.	ON.	2	2	2	2	9.	N QN	2
\$814-5-3.5		S. C. Se	N. D.	QN	GN	Q.	8	2	N O	8	· 兄	B	2	Q	Q.	QN
5814-5-55	5 25 E	41188	ΩN	QN	Q.	ND.	CN	9	9.	9	٠ 9	2	2	: 2	QN.	2
SB14-5-93	13.45	11138	ON	C.	S.	ΩN	QN	ND	ND	ND	, ON	9	2	8	QX QX	2
		Cleanup Level	213,000	1.050,300	S.	200	200	140,000	2	180	480	14,000	000'09	60.000	7,500	11.000

TABLE 5-24
Semicolatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

							Concentra	tions in micr	Concentrations in micrograms per kilogram	gram	İ		
Location Identifier	Date Sampled	Laboratory	Dibenzo (a,h) anthracene	Fluorene	Fluoranthene	Indeno (1,2,3-cd) pyrene	2-Methyl- naphthalene	4-Methyl pherol	Naphthalene	Phenanthrene	Pyrene	1,2,4-Trichloro- benzere	bis(2-Ethythexyl) phathalate
SB14-1-3 S	5 25 35	85788	c _N	ĝ	2	6X	QN	ΩN	Q.	N ON	N.D	2	ON
\$614-2-35	R. 25.00	KN70.3	2	2	8	2	S.	QN	S.	8	ΩN	QN	QN -
SB14-2-3 5	8.67.8	SST U	QX	2	2	QN	ΩX	Q.	2	있	δN.	. dn	ΩN
5814-2-55			QX	8	5.	8	Q.	2	Q.N.	9 2	8	g g	GN :
5814-3-5.5	56.51/5	[3]	QX	2	2	S.	4010	8	P.	<u>В</u>	οN	원.	Q.
SB14-3-7.5	5,25 45	F. 1.58	QN	2	9	22	2	2	В	2 2	δ.	Đ.	S.
SB14-5-3.5		. S	. Q.	g N	C.	S	Q.	O.	5	S.	<u>8</u>	₽.	Q.
5814-5-55		SET SE	QN	2	2.	S.	S.	ON.	ξ.	2 2	<u>8</u>	2 0	Ö
SB14-5-00		 138 188	ОХ	C.N.	GN.	ΩN	ΩN	O.N.	ND	ON	S	ND	ND
		Cleanup Level	200	140,000	140,000	200	140,000	200,000	140,000	140,000	110,000	2,000	009

* = duplicate ND = not detected

TABLE 5-25
Total Petroleum Hydrocarbons Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

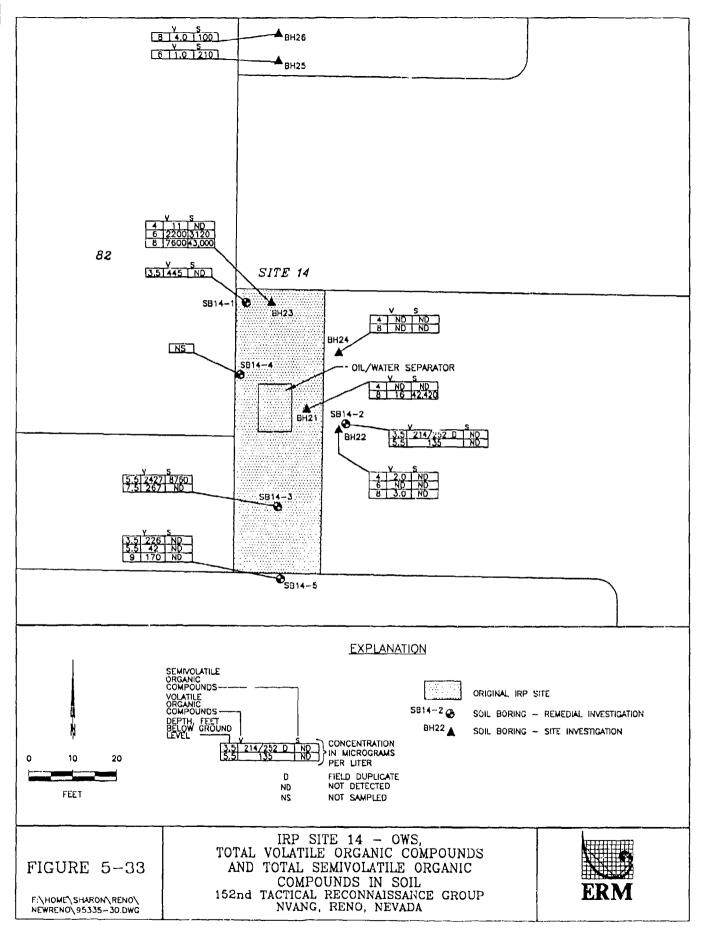
Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB14-1-3.5	05/24/95	88768	ND
SB14-2-3.5	05/24/95	88769	ND
SB14-2-3.5*	05/24/95	88770	ND
SB14-2-5.5	05/24/95	88771	ND
SB14-3-5.5	05/24/95	88773	2,5 00
SB14-3-7.5	05/24/95	88774	169
SB14-5-3.5	05/25/95	88775	ND
SB14-5-5.5	05/25/95	88776	ND
SB14-5-9.0	05/25/95	88777	ND
		Cleanup Level	210

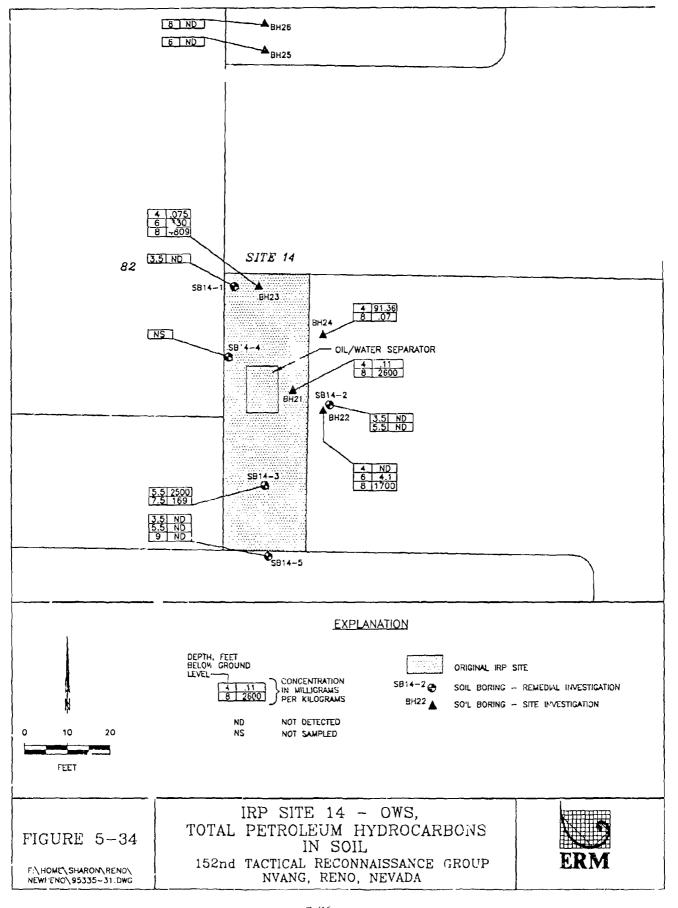
* = duplicate

mg/kg = milligrams per kilograms

TPH = total petroleum hydrocarbons

ND = not detected





5.6.4 Ground Water Investigation Results

Ground water samples were collected from Site 14 - OWS in May 1995 from monitoring wells MW15 and MW18. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995. Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-22 summarizes the ground water sampling program for chemical analysis.

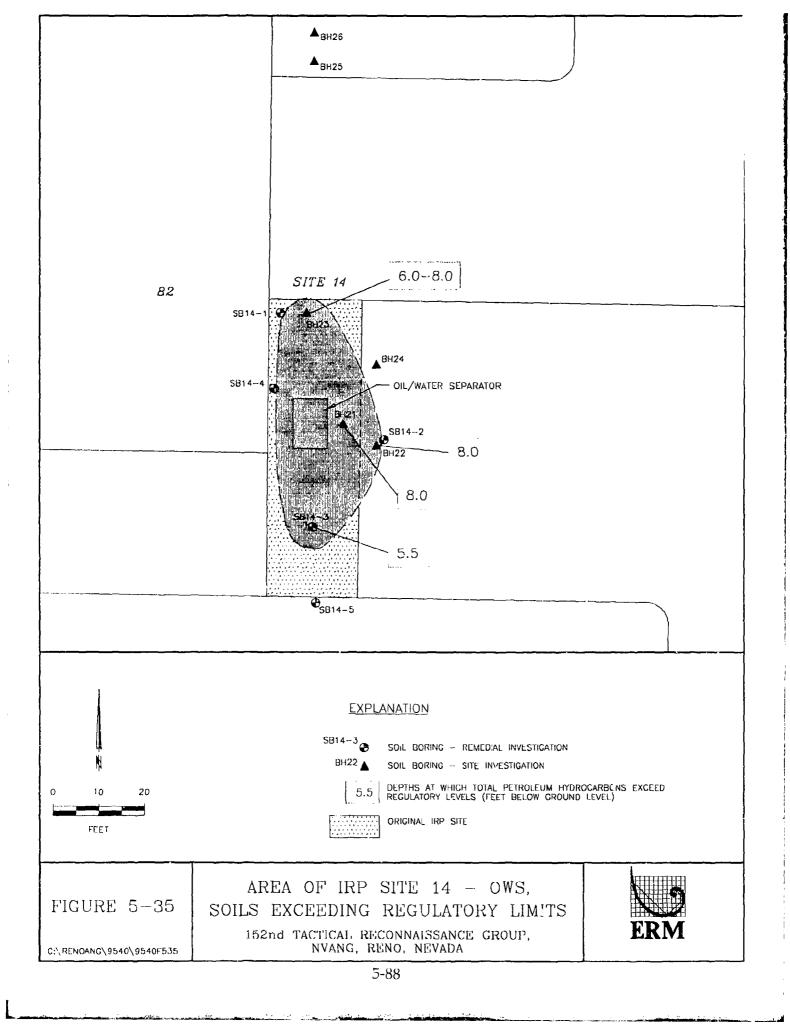
Complete analytical results for ground water samples collected from monitoring wells at Site 14 - OWS are available at the locations specified in Appendix F. Section 2.3.4 presents a summary of ground water chemical quality data collected from Site 14 - OWS monitoring wells prior to the RI.

Methylene chloride was the only VOC detected in ground water samples collected from monitoring wells MW15 and MW18. Detection of this compound is considered indicative of laboratory contamination. SVOCs were not detected in RI ground water samples collected from monitoring wells MW15 and MW18. TPH and lead were also not detected in RI ground water samples.

5.6.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 14 - OWS to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that may require remediation. The results of the comparison indicated that TPH exceeded cleanup standards in one or more RI and/or SI soil samples.

Figure 5-35 depicts the approximate area where TPH in soils exceeds cleanup standards. The extent of the TPH-impacted soil is consistent with release history at Site 14 - OWS (Section 2.3.4.2). Historical information suggests that several small JP-4 fuel spills (less than 50 gallons) have occurred near the corner of Building 82 and at least one overflow event has occurred at the Oil/Water Separator. Many of the more volatile components of JP-4 fuel (such as benzene, ethylbenzene, and toluene) were not detected in Site 14 - OWS soils. The absence of these components suggests that in-situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water (Section 7).



It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water. It is recommended that long-term monitoring be performed for Site 14 - OWS ground water to detect the possibility of future problems.

DISCUSSION OF ARARS

The following sections provide a preliminary summary of key Applicable or Relevant and Appropriate Requirements (ARARs) that may be relevant to FS development for the NVANG Base. ARARs will be more fully evaluated during the FS. The following preliminary ARARs have been identified.

6.1 Potential Federal ARARs

A discussion of the potential federal ARARs is given below.

6.1.1 CERCLA

Section 121 (d) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, addresses the management of federal facilities. The IRP has been designed to mirror site investigation requirements under CERCLA (PA/SI/RI/FS/RD/RA).

6.1.2 Resource Conservation and Recovery Act

Federal Resource Conservation and Recovery Act regulations governing hazardous waste management provide both action- and chemical-specific ARARs that may apply to IRP activities at the NVANG Base.

- <u>6.1.2.1 Waste Identification.</u> Materials excavated or removed from the site (e.g., drill cuttings, contaminated soil, and contaminated ground water) are regulated as hazardous waste if they meet the federal definition provided in 40 Code of Federal Regulations (CFR) 261.
- 6.1.2.2 Waste Generation and Transport. RI activities or remedial alternatives involving the movement or removal of hazardous waste trigger RCRA hazardous waste generator requirements provided in 40 CFR 262. When hazardous waste is shipped off site in regulated amounts, the mannesting and transport procedures in 40 CFR 263 must

be followed. As applicable, the NVANG Base will sign all hazardous waste manifests as the generator of the waste.

6.1.2.3 Land Disposal Restrictions. RCRA regulations in 40 CFR 268 set forth Land Disposal Restrictions (also known as Land Ban Requirements) for RCRA wastes. These restrictions were required by the Hazardous and Solid Waste Amendments of 1984 to RCRA to prohibit the continued land disposal of hazardous wastes beyond specified dates. However, wastes treated in accordance with chemical-specific treatment standards provided in 40 CFR 268 Subpart D may be land-disposed as provided therein. The Land Disposal Restrictions potentially affect the storage and disposal of hazardous wastes generated during RI or subsequent remedial activities and may be considered both action- and chemical-specific ARARs.

6.1.2.4 Treatment, Storage, and Disposal (TSD) Facilities. If remedial alternatives for the site involve the construction or off-site use of RCRA treatment, storage, or disposal (TSD) facilities, regulations provided in 40 CFR 264 become action-specific ARARs. Various subsections of 40 CFR 264 govern standards and procedures for the operation of hazardous waste TSD facilities. For example, a common disposal practice is to create a waste pile of contaminated soil as part of the remediation process. 40 CFR 264 Subpart L promulgates federal RCRA standards for waste piles, including their design, operating requirements, monitoring and inspection, closure, and post-closure care. Other subparts control tank systems, surface impoundments, land treatment units, landfills, incinerators, and miscellaneous TSD units.

6.1.3 Safe Drinking Water Act

Federal regulations pursuant to the Safe Drinking Water Act govern the quality, usage, and discharge of ground water. MCLs specified in 40 CFR 141.11-141.16 are legally enforceable federal drinking water standards established by the EPA. Maximum contaminant level goals (MCLGs) specified in 40 CFR 141.50-141.51 are nonenforceable, health-based goals for drinking water. MCLGs are set at levels at which no adverse health effects may arise. MCLs are set as close as practical to MCLGs. For noncarcinogens, MCLs are nearly always set at the MCLG. The EPA believes that MCLs are protective of public health; however, it does not recognize that specific circumstances may require more stringent standards (i.e., MCLGs) for the protection of public health and the environment. These ARARs may be used to identify a range of target cleanup levels for ground water at the NVANG Base. Table 6-1 contains a list of MCLs for constituents detected in ground water during RI activities.

TABLE 6-1

Maximum Contaminant Levels and Cleanup Levels for Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

		ns of Organic Compounds n micrograms per liter)
	Federal Maximum Contaminant Level	Subpart S (calculated)
Volatile Organic Compounds		
Benzene	5	
Chlorobenzene (monochlorobenzene)	100	
Toluene	1,000	
Ethylbenzene	700	
Xylenes (total)	000ري.	
Trichloroethylene	5	
Semivolatile Organic Compounds		
bis(2-Ethylhexyl)phthalate	6	
1,2-Dichlorobenzene (o-)	600	
1,3-Dichlorobenzene (m-)	600	
1,4-Dichlorobenzene (p-)	75	
2,4-Dimethylphenol	NA	700
2-Methylnaphthalene	NA	1,400
Naphthalene	NA	1,400
Phenananthrene	NA	1,400
Di-n-octyl phthalate	NA	700

Note: Refer to Section 8 for a description of the derivation of the above listed cleanup levels.

6.1.4 Clean Water Act

The federal Clean Water Act and pursuant regulations provide potential location-, chemical-, and action-specific ARARs for IRP activities at the NVANG Base.

6.1.4.1 Ambient Water Quality Criteria (AWQC). The EPA has promulgated Ambient Water Quality Criteria (AWQC) for surface and ground water through 40 CFR 131. Aligned with the Federal Clean Water Act criteria, the standard governing AWQC presents scientific data and guidance on the environmental effects of pollutants, rather than only establishing regulatory requirements. As a result, decision-makers evaluating remedial alternatives may compare their water quality data to federal data and guidance. Candidate remedial actions involving contaminated surface water or ground water must be evaluated within the context of follow-on water usage and the circumstances of the actual or potential release before implementation. As a general statement, AWQC are applied when evaluating cleanup levels for ground water.

6.1.4.2 National Pollutant Discharge Elimination System (NPDES). National Pollutant Discharge Elimination System (NPDES) regulations govern discharges to surface water and control surface water runoff from Station stormwater discharge systems. Promulgation of Clean Water Act Section 402 and formal ARARs are established for NPDES through 40 CFR 122 and 40 CFR 125, and provide action- and chemical-specific ARARs. The discharge of development water or produced water from monitoring wells will be in accordance with NPDES regulations.

6.1.5 Occupational Safety and Health Act (OSHA)

All site operations are governed by Occupational Safety and Health Act (OSHA) standards under 29 CFR 1910. The Health and Safety Officer for the RI/FS field investigation will ensure all site workers meet the requirements of the health and safety plan, possess and use all personal protective equipment, and take all precautions to eliminate exposure to unsafe or unhealthy situations. Other applicable OSHA ARARs include health and safety for federal service contracts (29 CFR 1926) and recordkeeping and reporting under 29 CFR 1904.

6.1.6 Hazardous Materials Transportation Act

If material containing hazardous wastes is to be transported off site, U.S. Department of Transportation hazardous material transportation

requirement in 49 CFR 171-179, pursuant to the federal Hazardous Materials Transportation Act, may be action-specific ARARs for RI activities. These requirements are supplemental to RCRA transporter requirements in 40 CFR 263.

6.1.7 Clean Air Act

The Federal Clean Air Act may provide action- and chemical-specific ARARs for IRP activities, including subsequent field investigations and remedial actions, including soil excavation or incineration. All remediation activities must comply with National Primary and Secondary Ambient Air Quality Standards found in 40 CFR 50. Rules governing particulate matter less than 10 microns in size (PM_{10}) are contained in 40 CFR 50, and are important from the potential detrimental effects of such particles on the lungs. All field activities involving air emissions must ensure compliance with the PM_{10} standard.

6.1.8 Federal Guidance To Be Considered

In addition to federal and state requirements that may be applicable or relevant and appropriate to IRP activities, federal nonregulatory criteria must be considered. Chemical-specific federal nonregulatory criteria, used to help characterize risks and to set cleanup goals, include the following:

- EPA Risk Reference Doses:
- EPA Health Advisories;
- EPA Carcinogen Assessment Group Potency Factors;
- EPA Acceptable Intake Values, Chronic and Subchronic; and
- EPA guidance manual on water-related fate of 129 priority pollutants.

6.2 State Requirements

One State of Nevada requirement applicable for activities at the Base is NDEP's Nevada Soil and Ground Water Remediation Policy (June 25, 1992). The intent of this policy is to provide a process to govern remedial action and cleanup standards. The policy utilizes existing state and/or federal regulatory standards, if available, as the initial

criteria. If such standards are not available or have not been developed for a particular contaminant, then other methods have been devised to determine remediation standards. Application of this policy to impacted soil and ground water at the NVANG Base is outlined in Section 8 of this report (Risk Assessment). Tables 6-1 and 6-2 summarize cleanup levels computed based on the NDEP remediation policy.

Another State of Nevada requirement applicable to activities at the Base is the policy governing required cleanup of petroleum hydrocarbon product from ground water. The UST Division of the NDEP has a policy that requires product recovery if one-half inch or more of free product is present on the ground water surface. The State of Nevada also has a statutory soil action level of 100 mg/kg of a petroleum substances present in soil (NAC 459.9973). An additional statute (NAC 459.9974) indicates that petroleum substances removed through a corrective action must be disposed of in a class I sanitary landfill or at a disposal or treatment facility approved by the NDEP.

TABLE 6-2

Cleanup Levels for Soil

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Co	oncentrations in mic	rograms per kilogra	ım
	Cleanup Level (based on Subpart S)	Cleanup Level (Ground Water Protection)	Method (Ground Water Protection)	Chemical Surrogate
olatile Organic Compounds	<u> </u>			
Acetone	8,000,000	350,000	Subpart S x 100	
Benzene	24,000	500	TCLP	
2-Butanone	48,000,000	200,000	TCLP	
Chlorobenzene	1,600,000	100.000	TCLP	•
Chloroform	120,000	6,000	TCLP	•
Ethylbenzene	8,000,000	7 0,000	MCL x 100	•
2-Hexanone	400,000	1 7, 500	Subpart S x 100	n-hexane/12
Methylene Chloride	93,000	500	MCL x 100	•
4-Methyl-2-Pentanone	6,400,000	280,000	Subpart S x 100	•
Tetrachloroethylene	14,000	500	MCL x 100	•
Toluene	16,000,000	100,000	MCL x 100	
Trichloroethylene	64,000	500	TCLP	
Xylenes (total)	160,000,000	1,000,000	MCL x 100	
Semivolatile Organic Compounds			•	
Acenaphthene	4,800,000	210,000	Subpart S x 100	•
Anthracene	24,000,000	1,050,000	Subpart S x 100	
Benzo(a)anthracene	960	200	MCL x 100	benzo(a)pyrene
Benzo(a)pyrene	96	200	MCL x 100	
Benzo(b)fluoranthene	960	200	MCL x 100	benzo(a)pyrene
Benzo(g,h,i)perylene	3,200,000	140,000	Subpart S x 100	naphthalene
Benzo(k)fluoranthene	9,590	200	MCL x 100	benzo(a)pyrene
bis(2-Ethylhexyl)phthalate	50,000	600	MCL x 100	, 2011/1/11/11
Carbazole	35,000	180	Subpart S x 100	•
Chrysene	96,000	480	Subpart S x 100	•
Dibenzo(a,h)anthracene	96	200	MCL x 100	benzo(a)pyrene
Dibenzofuran	320,000	14,000	Subpart S x 100	naphthalene
1,2-Dichlorobenzene	7,200,000	60,000	MCL x 100	, mapitumene
1,3-Dichlorobenzene	7,200,000	60,000	MCL x 100	1,2-dichlorobenzene
1 1		7,500	TCLP	
1,4-Dichlorobenzene	29,000	1	Subpart S x 100	•
2,4-Dichlorophenol	240,000	11,000	Subpart S x 100	•
Fluoranthene	3,200,000	140,000		•
Fluorene	3,200,000	140,000	Subpart S x 100	
2-Methylnaphthalene	3,200,000	140,000	Subpart S x 100	naphthalene
4-Methylphenol	400,000	200,000	TCLP	· books (a)
Indeno(1,2,3-cd)pyrene	960	200	MCL x 100	benzo(a)pyrene
Naphthalene	3,200,000	140,000	Subpart S x 100	1 and at 1
Phenanthrene	3,200,000	140,000	Subpart S x 100	naphthalene
Pyrene 1,2,4-Trichlorobenzene	2,400,000 800,000	110,000 7,000	Subpart S x 100 MCL x 100	
JP-4 (TPH)	4,800	210	Subpart S x 100	n-hexane

Note: Refer to Section 8 for a description of the derivation of the above listed cleanup levels.

CONTAMINANT FATE AND TRANSPORT

The following section summarizes the environmental fate and potential transport for those compounds identified to be present at concentrations exceeding regulatory limits in NVANG Base soils and/or ground water. Information regarding derivation of the regulatory concentration limits is provided in Section 8.0 of this report.

Also included in this section is a tabular listing of physical and chemical properties for the compounds (Table 7-1). The table lists those properties that influence physical transport and that impact selection of remedial alternatives. The properties include Henry's Law Constant (H), water solubility, and organic carbon/water partition coefficient (Koc). The following sections provide a brief summary of the relevance of these physical and chemical properties to contaminant fate and transport.

H provides an indication of the tendency of a constituent to volatilize or "partition" from the aqueous or water phase to the vapor phase. Organic compounds having H values greater than 10^{-3} atmospherecubic meter per mole (atm-m³/mol) tend to volatilize from water. Organic compounds having H values less than 10^{-3} atm-m³/mol may volatilize from water, but other processes such as adsorption to soil may be more important.

Water solubility is an important property affecting compound migration in soils and ground water. It is expressed in terms of the number of milligrams of a compound that can be dissolved in one liter of water under standard conditions of 25°C and one atmosphere of pressure. The higher the value of solubility, the greater the tendency for a compound to dissolve in water and hence be transported through soil and ground water.

Koc provides an index of the affinity of affinity of an organic compound to organic carbon in soils. Laboratory studies have shown organic forms of carbon present in soils or aquifer provides adsorption sites for organic compounds. When a compound adsorbs to organic carbon, its movement through soil or ground water is slowed or retarded. Koc provides a measure of the potential for a compound to

TABLE 7-1

Physical and Chemical Properties of Compounds Detected in NVANG Base Soil and Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Halt-Life Classes

						(Mackay et al, 1992 and 1993)	et al, 1993)
	Organic Compound	Chemical	Henry's Law	Log Koc	Water		:
Compound	Group	Formula	Constant	(B/Im)	Solubility,	Water	2011
Benzene	Monoaromatic Hydrocarbon	C ₆ H ₆	5.50E-03	1.69	1800	5	4
Benzo(a)anthracene	Polynuclear Aromatic Hydrocarbon	C18H12	6.60E-07	6.14	0.014	9	8
Benzo(a)pyrene	Polynuclear Aromatic Hydrocarbon	C20H12	<2.40E-05	5.7	0.004	9	8
Benzo b)fluoranthene	Polynuclear Aromatic Hydrocarbon	C20H12	1.20E-05	5.74	0.0012	9	8
Benzo(k)fluoranthene	Polynuclear Aromatic Hydrocarbon	C20H12	1.40E-04	6.64	0.00055	9	8
Bis(2-Ethylhexyl)phthalate Phtl	Phthalate Ester	C24H38O4	1.10E-05	5	6.4	NA	NA
Carbazole	Arcmatic Amine	C ₁₂ H ₉ N	NA	NA	AN	NA	NA
Chrysene	Polynuclear Aromatic Hydrocarbon	C18H12	7.26E-20	₹.39	0.0014	9	8
1,4-Dichlorobenzene	Chlorebenzene	C ₆ H ₄ C ₁₂	3.10E-03	2.2	62	9	7
Dibenzo(a,h)anthracene	Polycyclic Aromatic Hydrocarbon	C22H14	7.33E-09	6 22	0.0005	9	8
Indeno(1,2,3-cd)pyrene	Polynuclear Aromatic Hydrocarbon	C22H12	2.96E-20	7.49	0.062	NA	NA
1,2,4-Trichlorobenzene	Chlorobenzene	C ₆ H ₃ C _{l3}	2.30E-03	2.7	61	9	7
Trichloroethylene	Chlorinated Aliphatic Hydrocarbon C2HC13	n C2HCJ3	9.10E-03	1.81	1000	5	, 9
Toluene	Monoaromatic Hydrocarbon	C ₆ H ₅ CH ₃	6.7E-03	2.06	06†	5	4

Range, hours	100-300	300-1,000	1,000-3,000	3,000-10,000	10,000-30,000
dalf Life Classes	Class 4	Class 5	Class 6	Class 7	Class 8

atm-m3/mol = atmospheres-cubic meter per mole Log Koc = base 10 logarithm of the organic carbon/water partition coefficient mg/g = milligrams per gram mg/l = milligrams per liter

adsorb to soil and aquifer materials. The higher the Koc, the more likely the compound is to absorb to organic carbon.

The following sections present information from a variety of sources, including ORNL/Health and Safety Research Division (1989), Sims et al (1991), Montgomery and Welkom (1990), Mackey et al (1992 and 1993), and ORNL/ETS (1995).

7.1 JP-4 and its Components

This section provides a discussion of the fate and transport of JP-4 and its component compounds. JP-4 fuel and its component compounds have been detected at elevated concentrations in soil and/or ground water at all of the sites investigated.

The fate and transport of fuel hydrocarbons is complex because fuels in general, and JP-4 in particular, are composed of many individual hydrocarbons of widely varying physical and chemical properties. JP-4 is made by blending various distillate stocks such as naptha, gasoline, and kerosene. Each of these distillate stocks is composed of mixtures of hydrocarbons of varying composition. JP-4, for example, contains component hydrocarbons ranging primarily from C-4 to C-14 compounds with a distillation range of 140 to 270°C. Laboratory analysis has shown that the approximate chemical composition for JP-4 is 61 percent alkanes, 29 percent cycloalkanes, 8 percent alkylbenzenes, 1 percent indans and tetralins, and less than 1 percent naphthalenes. The environmental behavior of individual hydrocarbons within each of these groups can vary significantly.

Several compounds detected in NVANG Base soils are classified as PAHs. The compounds can result from combustion or burning JP-4 fuel.

7.1.1 Potential Routes of Migration

JP-4 has been detected as floating product on the ground water surface at Site 7 - POL Storage Area. JP-4-derived organic compounds have also been detected in soils extending from the surface to the top of the saturated zone. Potential routes of migration for JP-4 and its constituents include:

• Lateral flow of floating product on the water table;

- Vapor movement of constituent compounds in the vadose zone and from the vadose zone to the atmosphere;
- Transport of constituent compounds in solution or via sediment transport from surface soils via surface water runoff;
- Vertical transport of constituent compounds from the vadose zone to ground water via leaching; and
- Horizontal transport of constituent compounds in ground water via ground water flow.

7.1.2 Contaminant Persistence

The following subsections describe the chemical and biological reactions undergone by fuel hydrocarbons in the environment. Persistence of individual JP-4 constituents will vary depending on the chemical properties of the constituents. Some constituents will dissolve quickly in water, be sorbed less strongly onto soils, and may be more or less susceptible to degradation by chemical or biological action. Thus, the relative concentration of the constituents of the fuel will vary with time and distance from the site of initial contamination. This effect is called "weathering".

Biodegradation and chemical reactions such as volatilization and photo oxidation are the primary fate processes for fuel hydrocarbons in the environment.

7.1.2.1 Chemical Reactions. For fuel hydrocarbons, volatilization and photo oxidation are expected to be the most important chemical reactions in determining compound fate. However, the occurrence of these chemical reactions are dependent upon the nature of a fuel hydrocarbon release. Studies have shown that for releases of JP-4 to surface soils, hydrocarbon volatilization and subsequent photolysis in the atmosphere can occur. A release or the percolation of fuel hydrocarbons to the subsurface limits exposure to solar radiation, and these chemical reactions are therefore less likely.

Under environmental conditions, chemical reactions other than volatilization and photo oxidation of fuel hydrocarbons generally do not occur. Chemical reactions involving alkanes, which are a primary functional group in the composition of fuel hydrocarbons, usually take place only under vigorous laboratory circumstances involving free-radical chain reactions. Halogenation of an alkane can occur, but only if the halogen is disassociated into its individual atoms. Disassociation of a halogen requires ultra-violet light or temperatures in the range of

200 to 400° C. Alkanes can also undergo chemical reaction by pyrolysis, which is the disassociation of the alkane itself. Pyrolysis of alkanes occurs at temperatures in the range of 400 to 600°C, and so is not a naturally occurring environmental reaction.

Aromatic compounds such as benzene and toluene are another primary functional group in the composition of fuel hydrocarbons. As with alkanes, chemical reactions involving aromatic compounds are unlikely to occur under environmental conditions. This is primarily because the ring structure of an aromatic compound requires more energy to break than is typically available in the environment.

Naturally occurring chemical reactions of fuel hydrocarbons, specifically haloalkanes, have been demonstrated. However, naturally occurring chemical reactions involving haloalkanes are not typically an important factor in assessing environmental persistence due to the very small rate constants associated with the reactions.

7.1.2.2 Biodegradation. Biodegradation is an important factor in environmental fate processes for fuel hydrocarbons. Many of the hydrocarbon components of JP-4 are easily biodegraded in the environment; however, the actual amount of biodegradation is site-specific and dependent upon hydrocarbon concentrations. Very high concentrations of fuel hydrocarbons may be toxic to bacterial growth, while low concentrations may not be adequate to stimulate bacterial metabolism. Bacteria additionally require moisture and nutrients to thrive.

Recent studies have shown that indigenous bacteria, capable of metabolizing fuel hydrocarbons, are ubiquitous in subsurface environments. Bacteria in deeper soil generally have lower activities than do those in surface soils but mineralization of hydrocarbons can occur under aerobic conditions in deeper soil. Additionally, although bacteria in ground water are generally less active than in soil, biodegradation processes in ground water will usually progress indefinitely because of the continuous supply of nutrients and moisture.

In general, the primary conditions effecting the biodegradation of fuel hydrocarbons are the presence of oxygen, nutrients and moisture.

7.1.3 Contaminant Migration

Transport processes have been demonstrated to be more significant than transformation processes in determining the initial fate or petroleum hydrocarbon releases to soil and ground water systems. For JP-4 released to surface soils or waters, transport to the atmosphere through volatilization has been shown to be the primary fate pathway for most of the JP-4 hydrocarbons. Under conditions where volatilization is limited, such as low temperatures, subsurface release, or a concentrated spill, downward migration into the soil and to ground water may be a significant migration route.

Volatilization and photo oxidation as well as biodegradation can effect the environmental fate and transport of fuel hydrocarbons. Chemical reactions, however, are typically less important than biodegradation in assessing fuel hydrocarbon fate in the environment. Table 7-1 presents a summary of available data for the half-life of JP-4 derived compounds. The half-life ranges provide an order of the persistence of the compounds in ground water or soil

7.2 Trichloroethylene

This section provides a discussion of the fate and transport of TCE. TCE has been detected at concentrations equal to or greater than the MCL in ground water samples collected from monitoring wells MW05 (Site 4 - Former FTA) and MW08 (Site 12 - Aircraft Parking Apron Area).

7.2.1 Potential Routes of Migration

TCE has been detected in elevated concentrations in ground water at Sites 4 and 12. Potential routes of migration for TCE includes:

- Vapor movement of TCE from the water table to the vadose zone and from the vadose zone to the atmosphere; and
- Horizontal transport of TCE in ground water via ground water flow.

7.2.2 Contaminant Persistence

The environmental reactions which result in the degradation of TCE are reviewed in the following subsections. Three degradation processes are discussed here: aerobic processes, anaerobic processes, and abiotic processes.

7.2.2.1 Aerobic Processes. Aerobic degradation is a biological process in which bacteria utilize oxygen molecules in a water/soil system to degrade organic compounds. In the aerobic degradation process, the bacteria derive energy from the breakdown reaction, and utilize the

organic compound as a source of carbon. The aerobic process typically involves the addition of oxygen and the removal of hydrogen from the organic compound, such that the compound is oxidized.

The results of early laboratory studies indicated that the aerobic degradation of chlorinated solvents such as TCE was not possible; however, more recent studies have indicated that aerobic degradation of chlorinated solvents can occur, particularly when degrading bacteria are stimulated by the addition of methane and oxygen. However, this aerobic process is not believed to occur under natural conditions.

7.2.2.2 Anaerobic Processes. Anaerobic processes are those in which organic compounds are degraded by bacteria in the absence of oxygen. Instead, in anaerobic degradation, the bacteria utilize inorganic, oxygen bearing compounds such as nitrates, sulfates and carbon dioxide to degrade organic compounds. Studies have reported that under methanogenic conditions, where sulfate is used by bacteria to facilitate degradation, the degradation of TCE can occur via reductive dechlorination.

Reductive dechlorination is a process where bacterial action results in the removal of chlorine atoms from the chlorinated solvent. In anaerobic processes, reductive dechlorination will remove a chlorine atom from TCE resulting in transformation to a DCE isomer. Continued reductive dechlorination transforms the DCE isomer to vinyl chloride, and finally the reductive dechlorination process concludes with the transformation of vinyl chloride to ethene. The DCE isomer and vinyl chloride are referred to as intermediary chemical components of the reductive dechlorination process. Anaerobic degradation of chlorinated solvents was discovered when aquifers were found contaminated with intermediary chemical components which had not historically been used at the overlying sites.

Studies have indicated that during anaerobic degradation, the relative ratios of intermediary chemical components such as DCE and vinyl chloride are dependent upon the level of methanogenic activity of the water/soil system. Under typical environmental conditions, DCE will be more predominant than vinyl chloride. When methanogenic activity is very high, however, vinyl chloride will be the predominant intermediary chemical component.

Laboratory studies have not reached agreement as to which DCE isomer is formed from TCE during the anaerobic process. Various studies have indicated that 1,1-DCE as well as trans-1,2-DCE and cis-1,2-DCE are formed while another study have found that only the intermediary chemical component, 1,2-DCE. It has been suggested that

pH plays a role in the specific DCE isomer(s) formed from the reductive dechlorination of TCE.

In summary, while it is known that chlorinated organic compounds will degrade under anaerobic processes, the specific conditions required to initiate and maintain anaerobic processes are not well understood. The presence of only low concentrations of an organic compound in a water/soil system may not be adequate to stimulate bacterial growth such that anaerobic process are initiated. In addition, certain oxygen sources may be required by degrading bacteria to breakdown specific organic compounds. For example, there is conflicting research regarding the degradability of TCE under denitrifying conditions. Finally, the conditions that effect the rates at which anaerobic processes proceed are not completely quantified. It has been suggested that there is a specific redox potential threshold above which degradation TCE to vinyl chloride will occur rapidly.

7.2.2.3 Abiotic Processes. Abiotic processes involve strictly chemical and photochemical reactions, and physical processes such as leaching and volatilization. Abiotic processes can be important in the assessment of the degradation characteristics of a water/soil system.

TCE can also degrade abiotically. TCE may undergo a reductive dehalogenation process to form 1,1-DCE, cis-1,2-DCE or trans-1,2-DCE. This is typically a biological reaction, however, and is not a significant abiotic degradation reaction for TCE.

7.2.3 Contaminant Migration

TCE may undergo aerobic, anaerobic or abiotic degradation processes. In each case, however, these processes produce one or more isomers of DCE or vinyl chloride. Trans-1,2-DCE has been detected in ground water samples collected from Site 12 - Aircraft Parking Apron Area monitoring well MW08. Presence of this compound in ground water may indicate that degradation reactions may be occurring in ground water underlying the Base. Table 7-1 presents a summary of available data for the half-life of TCE in ground water and soils.

RISK ASSESSMENT

Information provided by the NDEP indicates that the regulatory structure currently in place in Nevada (as of January 1996) does not allow the application of risk assessments in lieu of numerical cleanup standards. The agency provides a list of action level concentrations for soil and ground water in its Contaminated Soil and Ground Water Remediation Policy dated June 25, 1992. However, application of the policy to the NVANG Base required some research regarding the most recent toxicological data for the compounds detected in Base ground water and soils. Additionally, information regarding potential fate and transport of compounds detected at the NVANG Base were used to outline the exposure scenarios that are required to apply the NDEP remediation policy to impacted soils and ground water. The following subsections provide a summary of processes and procedures used to develop action level concentrations for NVANG Base soils and ground water.

8.1 Potential Soil Remediation Standards

Consistent with NDEP guidance, the development of potential remediation standards for soils considered all potential exposure pathways associated with this medium. Based on analysis of potential exposures at the site, soil remediation standards were derived for two separate exposure pathways: direct contact with soils and protection of ground water. Direct contact standards were calculated following the methodology established in Subpart S of the RCRA Corrective Action Rule (EPA, July 1990). These calculated values reflected current toxicity data listed in Integrated Risk Information System (IRIS), EPA's primary toxicity data base (accessed July 1995), and in the compilation of preliminary remediation goals prepared by EPA/Region IX (September 1995). Table 8-1 presents a summary of toxicological factors used in the remediation goal calculations.

Soil remediation standards developed for evaluation of the ground water pathway were based on a tiered approach, as described below:

 Where a Toxicity Characteristic Leaching Procedure (TCLP) standard was available, that numeric value was used as the remediation

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TABLE 8-1

Toxicological and Regulatory Dt ta for Detected Compounds and Surrogates 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Reference Dose-	Carcinogenic Slope	Carcinogenic	TCLP (mg/l)	
	oral (mg/kg/day)	Factor-oral (mg/kg/day)^-1	Class	Limit	MCL (mg/l)
Volatile Organic Compounds					
Acetone	0.1		D		
Benzene		0.029	A.	0.5	0.005
2-Butanone	9:0		D	200	
Chlorobenzene	0.02		D	100	0.1
Chloroform	0.01	0.0061	B2	9	0.1/0.08
Ethylbenzene	0.1		D		0.7
2-Hexanone	(use n-hexane values and divide by 12)	and divide by 12)	D		
Methylene chloride	90.0	0.0075	B2		0.005
4-Methyl-2-pentanone	80.0		D		
Tetrachloroethylene	0.01	0.052	B2		0.005
Toluene	0.2		D		1
Trichloroethylene	0.006	0.011	B2	0.5	0.005
Xylenes (total)	2		D		10
n-Hexane (surrogate)	90.0		D		
Semivolatile Organic Compounds					
Acenaphthene	90.0		D		
Anthracene	0.3		D		
Benzo(a)authracene		0.73	B2		
Benzc(a)pyrene		7.3	B2		0.002
Benzo(b)iluoranthene		0.73	B2		
Benzo(ghi)perylene	(see naphthalene)		D		
Benzo(k)fluoranthene		0.073	B2		
Bis(2-ethylhexyl)phthalate	0.02	0.014	B2		900.0

TABLE 8-1

Toxicological and Regulatory Data for Detected Compounds and Surrogates 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Reference Dose- oral (mg/kg/day)	Carcinogenic Slope Factor-oral (mg/kg/day)^-1	Carcinogenic Class	TCLP (mg/l) Limit	MCL (mg/l)
Carbazole		0.02	B2		
Chrysene		0.0073	82		
Dibenz(a,h)anthracene		7.3	B2		
Dibenzofuran	(see naphthalene)		Ω		
1,2-Dichlorobenzene	60:0		D		9.0
1,3-Dichlorobenzene	(see 1,2-dichlorobenzene)	(ene)	D		9.0
1,4-Dichlorobenzene	0.23	0.024	B2	7.5	0.075
2,4-Dichlorophenol	0.003		D		
Fluoranthene	0.04		D		
Fluorene	0.04		D		
2-Methylnaphthalene	(see naphthalene)		Ω		
4-Methylphenol	0.005		D	200	
Indeno(1,2,3-cd)pyrene		0.73	B2		
Naphthalene	0.04		D		
Phenanthrene	(see naphthalene)		D		
Pyrene	0.03		D		
1,2,4-Trichlorobenzene	0.01		D		0.07
Di-n-octyl phthalate	0.02		D		

A = known human carcinogen

B2 = probable human carcinogen, sufficient evidence in animals and equate data in humans

D = inadequate evidence to classify

TCLP = toxicity characteristic leaching procedure

MCL = maximum contaminant level (May 1995)

mg/kg/day = milligrams per kilogram per day mg/l = milligrams per liter

standard. The numeric TCLP value [in milligrams per liter (mg/l)] was used as the remediation standard (in mg/kg) without any unit conversion; a unit conversion factor [i.e., 1,000 micrograms per milligram (μ g/mg)] was used to convert the remediation standard from mg/kg to μ g/kg.

- In the absence of a TCLP standard, MCLs were used as the basis for deriving ground water protection standards. MCLs were multiplied by 100, consistent with the methodology used to derive TCLP standards; as described above, no conversion factor was used to convert the modified MCL (in mg/l) to a soil standard (mg/kg), although the mg/kg value was converted to a concentration in μg/kg using a factor of 1,000 (i.e., 1,000 μg/mg).
- For constituents where neither a TCLP standard nor an MCL was available, a drinking water equivalency level was developed, following the methodology for deriving ground water standards given in Subpart S of the RCRA Corrective Action Proposed Rule (July 1990). These calculated levels incorporated current toxicity data from the sources listed above. Calculated ground water standards were then multiplied by 100 to derive a soil remediation standard protective of ground water.

Where toxicity data were not available for a specific constituent, a surrogate compound was selected, and toxicity data for the surrogate compound were used to derive a remediation goal. Selection of the surrogate compound was based on structure and activity of both the surrogate and the compound for which no toxicity data were available. Table 8-2 summarizes the remediation goal calculations for NVANG soils.

It should be noted that the methodologies used to establish potential remediation standards represent conservative approaches, both to the evaluation of direct contact exposures and to the assessment of potential soil impacts on ground water quality. Calculation of remediation standards protective of direct contact exposures is predicated on the assumption that the site is developed for residential purposes, and that there is frequent and routine direct contact with soils. Remediation standards developed for protection of ground water are based on a similarly conservative approach, in which it is assumed that ground water is used for a drinking water supply, and that constituents migrate easily through subsurface soils. In reality, the migration of many of the constituents detected at this site (in

TABLE 8-2
Summary of Cleanup Level Calculations for Soil
152rd Tactical Reconnaissance Group, NVANG, Reno, Nevada

						Concentrations	Concentrations in micrograms per 'tilogram	r 'cilogram				
	Sire 7 RI Data	Sie 7 Si Data	Site 5 RI Data	Site 5 SI Data	Site 4 RI Data	Site 4 SI Data	Site 14 RI Data	Site 14 Sf Data	Cleanup Level (based on Subpart S)	Cleanup Level (Ground Water Protection)	Method (Ground Water Protection)	Chemical Surrogate
Volatile Organic Compounds												
Acetone	547	120	27.	1,900	1,910	1,800	383		8,000,000	350,000	Subpart 5 x 100	
Benzene	2,800	670	-		ጽ	2			24,000	200	100	
2-Butanone		1,300			1,160			11	48,000,000	200,000	ICLP	
Chlorobenzene					2,350				1,600,000	100,000	10.0	
Chloroform	12	*		2		2		2	120,000	6,000	ICLF.	
Ethylbenzene	37,900	24,000	211	1,800	3,400	1,300	}		8,000,000	70,000	MCL x 100	(1)
2-Hecanone							32		400,000	1/500	Subpart 5 x 100	n-nexane/12
Methylene Chloride	₩			4,200		1,900	62	5,300	93,000	202	MCL x 100	
4-Methyl-2-Pentanone			41				18		6,400,006	280,000	Subpart 5 x 100	
Tetrachloroethylene					35		•	3	14,000	200	MCL x 100	
Toluene	20,100	3,900	255		120				16,000,000	100,000	MC. x 100	
Trichloroethylene	2		24						64,000	200	TCLP	
Xylenes (total)	258,000	82,000	2,040	002'6	12,000	009'1	2,300	2,500	160,000,000	1,000,000	MCL x 100	
						1						
Semivolatile Organic Compounds												
Aceraphthene	190	1,300						210	4,800,000	210,000	Subpart 5 x 100	
Anthracene	810	2,000							24,000,000	1,050,000	Subpart S x 100	
Benzo(a)anthracene	2,900	5,200		52					096	200	MCL x 100	benzo(a)pyrene
Benzo(a)pyrene	2,500	5,600		52					*	200	MCL x 100	
Berzo(b)fluoranthene	4,000	000,6		8					096	200	MCL x 100	benzo(a)pyrene
Benzo(g.h.J)perylene	1,000	2,600		88					3,210,000	140,000	Subpart 5 x 100	naphthalene
Benzo(k)fluoranthene	2,300	000'06		8					065.6	200	MCL x 100	benzo(a)pyrene
bis(2-Ethylbexyl)phthalate	ક્ક	380		200	461	230		210	20,000	009	MCL x 100	
Carbazole	006	1,700					1		35,000	981	Subpart 5 x 100	
Chrysene	3,400	6,300		3					000'96	3	Subpart Sx 'W	
Diberzo(a,h)anthracene	520			41					8	200	MCL x 100	benzo(a)pyrene
Dibenzofuran	06Z	\$			-			210	320,000	14,000	Subpart 5 x 100	naputnaiene
1,2-Dichlorobenzene					22,500				7,200,000	60,000	MCL x 100	1.7 dishlorodoro
1,3-Dichlorobenzene					8,320		-		7,200,000	60,00	MCL X 100	ייל-מומווחו מסבות ביוב
1,4-Dictionsbenzene		į			0,700				000,62	11000	Subnart 5 x 100	
2.4-Uschlorophenol	200	73.000		8	74.7				3 200 000	140,000	Subpart 5 x 100	
Fitoresis Established	270	0001		21	-		- - 		3200.000	140,000	Subpart S x 100	
7. Mathematical photospace	200	00000		200	728	1200	4.010	28,000	3,200,000	140,000	Subpart S x 100	naphthalene
4-Methylphenol		20			714				400,000	200,000	TCLP	
Indenoil 23-chorrene	1,300	2,700		39					986	200	MCL x 100	benzo(a)pyrene
Naphthalene	1540	13,000		2,400	536		4,750	16,000	3,200,000	140,000	Subpart 5 x 100	
Phenanthrene	4,800	11,000		88					3,200,000	140,000	Subpart S x 100	naphthalene
Pyrene	006'6	16,000		E.					2,400,000	110,000	Subpart 5 x 100	
1,2,4-Trichlorobenzene				(474	10,500	210			800,000	2,000	MCL x 100	
		000	Concentr	trations in milig	rations in milligrams per knogram	E	200	000	008 7	012	Subpart 5 v 100	o-hexane
JF4 (IFH)	חשכיכ	JAC'7	007	7 001'7	VVE'1	1	200/2	, 200/E	ANNYE	2	was and in	

RI = Remedial Investigation
SI = Site Investigation
MCL = maximum contaminant kevel
TPH = total petroleum hydrocarbors
TCLP = toxicity characteristic feaching procedure

particular, the polynuclear aromatic hydrocarbons or PAHs) will be limited because of their low solubility and their tendency to sorb to soils.

8.2 Potential Ground Water Remediation Standards

Consistent with NDEP guidance, potential remediation standards for ground water were based primarily on federal MCLs promulgated for drinking water under the Safe Drinking Water Act. Where MCLs were not available for a specific constituent, a drinking water equivalency level was derived following the methodology set forth in Subpart S of the RCRA Corrective Action Proposed Rule (EPA, July 1990). No federal or state regulatory standard is available for TPH on ground water. Calculated remediation standards for ground water were based on current toxicity data listed in IRIS (EPA, July 1995) and the summary of preliminary remediation goals prepared by EPA/Region IX (1995). Table 8-3 summarizes the remediation goal calculations for NVANG ground water.

8.3 Risk Evaluation

The following subsections summarize risk evaluation for the four IRP sites investigated during the RI. The evaluation includes a summary of source area(s) for contaminants, environmental fate of contaminants, and potential receptors.

8.3.1 Site 4 - Former FTA

Contaminants identified in Site 4 - Former FTA soils include TPH and the petroleum components 1,2,4-trichlorobenzene and 1,4-dichlorobenzene. The source area for these contaminants is well defined and is limited to a zone from approximately 5 to 8 feet bgs (Figure 5-14).

Contaminants identified in Site 4 - Former FTA ground water include TCE and benzene. These contaminants occur in ground water only in the immediate vicinity of monitoring well MW05 (Figures 5-13 and 5-13A). TCE was not detected in soil samples collected during either the SI or the RI field activities. Benzene was detected in only one SI soil sample at a concentration less than its cleanup level for ground water protection.

TABLE 8-3

Summary of Cleanup Level Calculations for Ground Water 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

		Max	ximum Concentrations	Maximum Concentrations of Organic Compounds (All concentrations in micrograms per liter)	ounds ter)	
	Site 7 RI Data	Site 5 RI Data	Site 4 RI Data	Site 14 RI Data	Federal MCL	Subpart S (calculated)
V 'atile Organic Compounds						
Benzene	1,300	14	23		3	
Chlorobenzene (monochlorobenzene)			2.4		100	
Toluene	2,000	3	25		1,000	
Ethylbenzene	370	20	150		200	
Xvlenes (total)	1,500	20	069		10,000	
Trichlorœthylene			12		5	
Semivolatile Organic Compounds						
bis(2-Ethylhexyl)phthalate	1,700		2		9	
1,2-Dichlorobenzene (o-)			13		009	
1,3-Dichlorobenzene (m-)			4.1		909	
1,4-Dichlorobenzene (p-)			5.3		75	
2,4-Dimethylphenol	12				NA	700
2-Methylnaphthalene	63				NA	1,400
Naphthalene	53		16		NA	1,400
Phenananthrene	10				NA	1,400
Di-n-octyl phthalate	36				NA	700

- contained in Drinking Water Regulations and Health Advisories (EPA/Office of Water, May 1995). 1. Maximum Contaminant Levels (MCLs) and Health Advisories are based on information
 - 2. NA MCL not available
- toxicity indices listed in Region IX Preliminary Remediation Goals/Second Half 1995, S. Smucker, Ph.D. Proposed Corrective Action Rule (EPA, 1991). Calculated concentrations are based on current 3. Subpart S concentrations have been calculated following the methodology outlined in the

RI = Remedial Investigation

As discussed in Section 7, petroleum hydrocarbons and associated compounds (benzene, 1,2,4-trichlorobenzene, and 1,4-dichlorobenzene) can be biodegraded in soils and ground water. By contrast, TCE generally has a higher degree of persistence in ground water. The primary potential transport pathways for contaminant movement at Site 4 - Former FTA are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 4 - Former FTA is comprised of bare ground and grass associated with a recreational field at the site. Exposure of potential receptors to contaminated soil at Site 4 - Former FTA is unlikely under current conditions because the area of soil contamination lies 5 to 8 feet bgs.

Exposure of potential receptors to existing ground water contaminants at the site is also unlikely. Samples collected from monitoring wells located approximately 60 feet downgradient of the area of ground water contamination did not contain benzene or TCE at concentrations greater than cleanup levels. The area of TCE and benzene contamination is located completely within the NVANG Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 4 - Former FTA.

8.3.2 Site 5 - Former FTA

TPH was the only contaminant identified in Site 5 - Former FTA soils. The source areas for TPH are well defined and appear to comprise discontinuous soil 1 orizons at 2 feet bgs at RI soil boring SB5-2 and 6 feet bgs at SI soil boring BH6 (Figure 5-20).

Benzene is the only contaminant identified in Site 5 - Former FTA ground water. Benzene occurs in ground water at concentrations greater than the cleanup level only in the immediate vicinity of monitoring well MW17 (Figure 5-21). Benzene was not detected in any of the soil samples collected from SI and RI borings.

Petroleum hydrocarbons and benzene can be biodegraded in soils and ground water. The primary potential transport pathways for contaminant movement at Site 5 - Former FTA are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 5 - Former FTA is comprised of bare ground and

with a native grass vegetated surface. Approximately one-half of the area of soil contamination lies outside the existing boundary of the NVANG Base. It is estimated that a portion of the area of ground water contamination may lie off Base. Exposure of potential receptors to contaminated soil at Site 5 - Former FTA is unlikely under current conditions because the area of soil contamination lies 2 to 6 feet bgs.

Exposure of potential receptors to benzene in ground water at the site is also unlikely. Samples collected from monitoring well MW30, located approximately 60 feet downgradient of the area of ground water contamination, did not contain detectable concentrations of benzene. The majority of the area of benzene contamination is within the NVANG Base boundary. A portion of the area may lie outside the Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 5 - Former FTA.

8.3.3 Site 7 - POL Storage Area

TPH, benzene, toluene, and PAHs were identified as contaminants in soils at Site 7 - POL Storage Area. The source areas for the individual contaminants is complex; however, three distinct source areas can be identified for overall soil contamination at the site (Figure 5-30). Soil contamination was identified at Site 7 - POL Storage Area from approximately 2 to 7.5 feet bgs.

Areas of floating pure product for fuel hydrocarbons have been identified at Site 7 - POL Storage Area. Benzene is the primary dissolved phase contaminant identified in ground water at this site. Benzene occurs in ground water at concentrations greater than the cleanup level in the eastern half of the IRP site. Secondary contaminants, bis(2-ethylhexyl)phthalate and toluene, were also identified at the site. The area of ground water contamination for these compounds lies within the larger area of benzene contamination (Figure 5-31).

Petroleum hydrocarbons and its components can be biodegraded in soils and ground water. The primary potential transport pathways for contaminant movement at Site 7 - POL Storage Area are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 7 - POL Storage Area is comprised primarily of asphaltic concrete. Two areas of bare ground exists at the site: an approximate 7-foot wide strip along the fence line in southern portion

of the area; and an approximate 30-foot wide strip along the western boundary of the site.

It is estimated that a small portion of the area of soil contamination may lie off Base (Figure 5-30). Exposure of potential receptors to contaminated soil at Site 7 - POL Storage Area is unlikely under surface current conditions because the area of soil contamination lies 2 to 7 feet bgs.

Exposure of potential receptors to benzene, toluene or bis(2-ethylhexyl)phthalate in ground water at the site is also unlikely. Samples collected from monitoring wells MW23 and MW31, located 100 feet downgradient of the USTs did not contain detectable concentrations of these compounds. The majority of the area of ground water contamination is within the NVANG Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 7 - POL Storage Area.

8.3.4 Site 14 - OWS

TPH was the only contaminant identified in Site 14 - OWS soils. The source area for TPH is well defined and appears to occur in zone 5 to 8 feet bgs (Figure 5-35). No ground water contamination has been identified at this site.

As discussed in Section 7, petroleum hydrocarbon compounds can be biodegraded in soils. The primary potential transport pathways for contaminant movement from soils at Site 14 - OWS is leaching of soil contaminants to ground water. Based on the review of ground water data collected during the SI and RI, leaching does not appear to be a significant transport pathway at this site.

The ground surface above the defined areas for soil contamination at Site 14 - OWS is comprised of soil covered with a cobble/gravel surface. Exposure of potential receptors to contaminated soil at Site 5 - Former FTA is unlikely under current conditions because the area of soil contamination lies 5 to 8 feet bgs.

SECTION 9.0

CONCLUSIONS

The following section provides a brief summary of conclusions based on RI field activities at IRP Sites 4, 5, 7, and 14.

9.1 Site 4 - Former FTA

An area of soil was identified in which TPH, 1,2,4-TCB, and 1,4-DCB exceeded cleanup goals. In general, this area is relatively small and is in the immediate vicinity of soil borings SB4-5 and BH14. This area is located immediately upgradient from monitoring well MW05 and potentially provides a continuing source of petroleum-derived hydrocarbons and VOCs to Site 4 - Former FTA ground water.

An area of ground water was identified that contained TCE and benzene concentrations equal to or exceeding their respective cleanup standards. This area is confined to the immediate vicinity of monitoring well MW05. Comparison of concentrations of these compounds in samples collected in March 1992 and July 1995 suggest that significant decreases have occurred.

9.2 Site 5 - Former FTA

An area of TPH-impacted soil was identified in the immediate vicinity of monitoring well MW17. The impacted soil provides a continuing source of petroleum-derived hydrocarbons to Site 5 - Former FTA ground water. This soil area lies partially on Airport property and partially on the NVANG Base.

Benzene exceeds cleanup standards in ground water samples collected from monitoring well MW17. Review of additional data for Site 5 - Former FTA suggests that benzene-impacted ground water is confined to the immediate vicinity of monitoring well MW17. A portion of this area of benzene-impacted ground water probably extends off Base. A comparison of concentrations of these compounds in samples collected in March 1992 and May 1995 suggests that no significant changes have occurred.

9.3 Site 7 - PC L Storage Area

Approximately 13,500 gallons of floating product existed within the UST excavation area as of mid-August 1995. This estimate was based on data collected during product removal operations in late-August 1995. The floating product was discovered during RI investigations at Site 7 - POL Storage Area. The product is within the gravel backfill in the UST excavation area. Geologic conditions surrounding the UST excavation area have resulted in minimizing the migration of floating product from the excavation. Product removal operations were implemented during a ten-day period, August 23 through September 7, 1995. During this period, approximately 10,000 gallons of product was removed from the gravel backfill.

One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with a surface spill event.

A relatively large area of JP-4 impacted soil was identified. Review of the areal and vertical distributions of TPH, benzene, toluene, and other fuel component compounds (i.e., PAHs) suggests that the complex distribution of impacted soil is consistent with the product release history at Site 7 - POL Storage Area. Several JP-4 spills have occurred in the Site 7 - POL Storage Area, most of which are reported to have been flushed into soil and gravel areas surrounding the refueling stand. The presence of fuel hydrocarbons in the soil has impacted ground water quality at Site 7 - POL Storage Area.

An area of ground water was identified that contained benzene, toluene, and bis(2-ethylhexyl)phthalate exceeding their respective cleanup standards. Although bis(2-ethylhexyl)phthalate is known as a common laboratory contaminant, no information is available to suggest that laboratory contamination is responsible for detection of this compound in Site 7 - POL Storage Area ground water samples.

The area of ground water impacted by benzene comprises the eastern half of Site 7 - POL Storage Area. This area may actually extend off Base in the vicinity of the Airport's control tower. However, it is not anticipated that the benzene-impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution. The area of ground water impacted by bis(2-ethylhexyl)phthalate is confined to the immediate vicinity of monitoring wells MW07, MW25, and product monitoring well T-4. The area of ground water impacted by toluene is confined to the immediate vicinity of product monitoring well T-4.

9.4 Site 14 - OWS

TPH in soils exceed cleanup standards in an area of soil at Site 14 - OWS. The distribution of the TPH-impacted soil is consistent with the release history at Site 14 - OWS. The absence of significant VOCs in the impacted areas suggests that in situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water.

It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water.

RECOMMENDATIONS

The following summarizes recommendations based on review of RI and SI data for the NVANG Base.

10.1 Site 4 - Former FTA

- An FS should be performed for Site 4 Former FTA soils to evaluate remedial alternatives for soil containing TPH, 1,2,4-TCB, and 1,4-DCB. The FS should evaluate various alternatives to eliminate the source of these contaminants from soil to prevent transport to ground water.
- Long-term ground water monitoring should be performed at Site 4 Former FTA, based on the limited extent of ground water affected
 and based on the current declining concentration trend for TCE and
 benzene.

10.2 Site 5 - Former FTA

- An FS should be performed for Site 5 Former FTA to evaluate remedial alternatives for ground water containing benzene. The FS should evaluate various alternatives to eliminate or mitigate transport downgradient transport.
- An FS should be performed for Site 5 Former FTA soils to evaluate remedial alternatives for soils containing petroleum hydrocarbons, a portion of which lies off Base. The FS should evaluate alternatives to eliminate or mitigate the potential threat to ground water quality.

10.3 Site 7 - POL Storage Area

 An FS should be performed for the remaining free product in the excavation backfill based on the potential threat posed by this source of petroleum hydrocarbons to Site 7 - POL Storage Area ground water.

- A periodic product thickness monitoring program and mitigation by bailing should be instituted at product monitoring well T-4. A similar program was successful in significantly reducing free product thickness at monitoring well MW07.
- An FS should be performed for Site 7 POL Storage Area to evaluate remedial alternatives for soils containing petroleum hydrocarbons, a portion of which lies off Base. The FS should evaluate alternatives to eliminate or mitigate the potential threat to ground water quality.
- An FS should be performed for Site 7 POL Storage Area to evaluate remedial alternatives for ground water containing benzene, toluene, and bis(2-ethylhexyl) phthalate. A portion of the area of ground water containing elevated concentrations of benzene lies off Base. The FS should evaluate various alternatives to eliminate or mitigate downgradient transport.

10.4 Site 14 - OWS

• Long-term monitoring should be performed for Site 14 - OWS ground water to detect the possibility of future problems.

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APPENDIX A

TECHNICAL MEMORANDA FOR FIELD ACTIVITIES

FILE COPY

Memorandum

To:

Robin Weesner

From:

Nevine Melikian, ERM-West.

Subject:

Ground Water Monitoring, NVANG, May 11, 1995

Date:

May 1, 1995

This document outlines the details of ground water sampling on May 11 through May 14, 1995 and on May 24, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On May 11 through May 14, ground water will be sampled at 17 existing monitoring wells. On May 24, ground water will be sampled at 4 new monitoring wells installed by ERM in the period between May 15 and May 23, 1995. The locations of all monitoring wells to be sampled are shown in attached figure. The intallation and sampling of 6 additional optional monitoring wells may be required.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Steve Becker, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

A two day waiting period is required between well development and ground water sampling at the newly installed monitoring wells.

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, Sp. condition, and temperature) will be recorded on Ground Water monitoring forms. Well volume

information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25 and MW07 will be recorded. If the thickness is measurable, floating product will be removed using a non disposable bailer. Monitoring wells MW25 and MW07 will be sampled last.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

May 11, 1995:

MW15, MW18, MW16, MW17

May 12, 1995:

MW19, MW08, MW27, MW26, MW24

May 13, 1995:

MW23, MW03, MW04, MW05

May 14, 1995:

MW10, MW06, MW25, MW07

May 24, 1995:

MW28, MW29, MW30, MW31

This schedule may be altered due to site operations and/or sampling speed.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the second sampling round). For example, MW03-95-2 represent a ground water sample collected during the second round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

• Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;

- Semi-volatile organic compounds (SVOCs) using EPA Method 3550/8270;
- Total petroleum hydrocarbons (TPH) using EPA Method 5030/8015;
 and
- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical Att: Lora Dunlap 6310 Rothway Houston, Texas 77040-9835 (713) 690-4444

A validation package will be requested from GSA for ground water samples collected from monitoring well MW23 and MW05, and MW31, therefore, a separate Chain-of-Custody form will be prepared for MW23, MW05 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

<u>Duplicate Samples</u>. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring wells MW18, MW06, and MW28. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

<u>Trip Blanks.</u> Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/M⁻⁻ will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from monitoring well MW27 and MW30. This should be indicated on the Chain-of-Custody form.

<u>Field Blanks</u>. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

<u>Equipment Rinsate</u>. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

Analysis	Method	Container	Sampling Locations						
	:			Field Dup	MS/MS D	Equip Rinse	Trip Blank	Field Blank	
VOCs	8010/8020	2 X 40 ml glass	21	3	2	3	5	3	37
SVOCS	8270	2 X 1-liter glass	21	3	2	3	-	3	32
TPH	8015	2 X 40 ml glass	21	3	2	3	-	3	32
Lead	7420	250 ml plastic	21	3	2	3	-	3	32

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Bett:

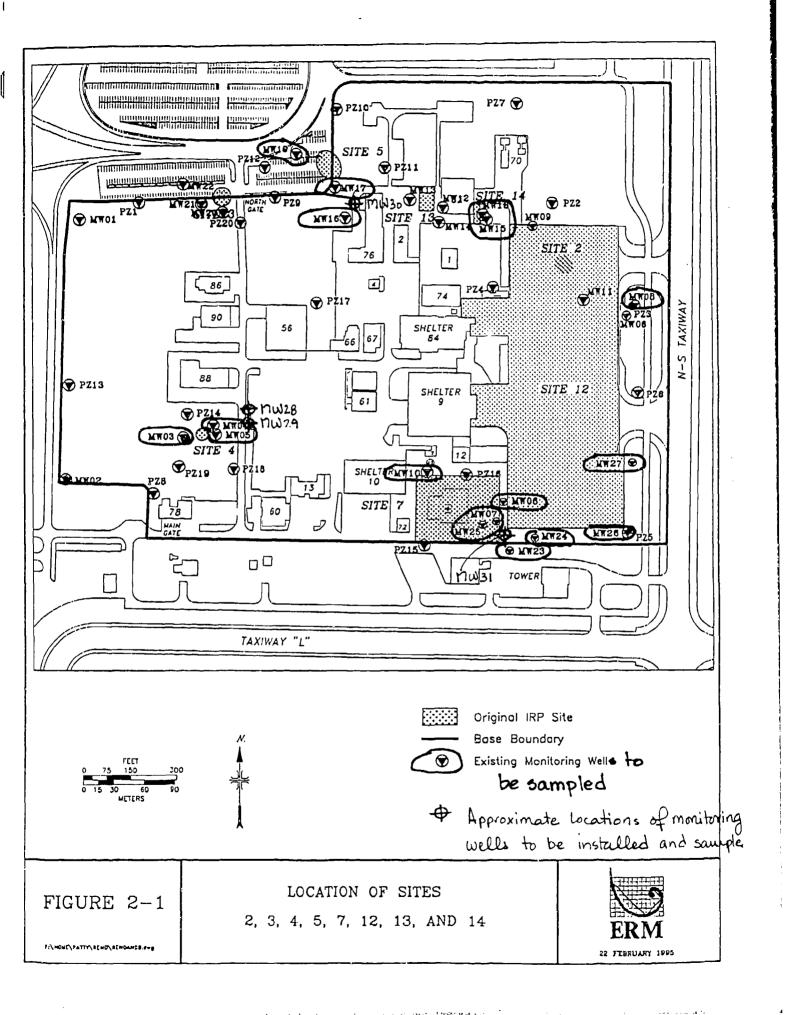
- 2-inch submersible pump, controller, and real
- Water level meter
- Photoionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Non-disposable bailer
- ASTM Type I reagent water
- Alconox or Liqui-Nox
- Aluminum foil

Arizona Office Responsibility:

- Pesticide grade methanol
- Sampling bottles and coolers
- Ground water monitoring data forms
- Calibration forms
- Chain of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan

NVANG Well Volume Information

Date of Measurement	Well Number	Casing Elevation (ft)	Head Elevation (ft) 9/94	Depth to Water (ft below measuring point)	Casing Depth (ft)	Saturated Interval (ft)	3 Casing Volumes (gal)
1/95	MW06	4398.69	4394.04	4.65	14.5	9.85	4.82
	MW07	4397.90	4393.80	4.1	14.0	9.9	4.85
	MW08	4399.21	4394.11	5.1	14.0	8.9	4.36
	MW23	4399.40	4393.62	5.78	15.0	9.22	4.51
	MW24	4398.67	4393.47	5.2	15.0	9.8	4.80
	MW25	4397.78	4393.70	4.08	13.0	8.92	4.37
	MW26	4397.32	4392.71	4.61	15.0	10.39	5.09
	MW27	4397.32	4394.16	3.16	15.0	11.84	5.80
3/93	MW03	4404.38	4396.84	7.54	16.0	8.46	4.14
	MW04	4403.69	4396.30	7.39	16.0	8.61	4.21
	MW05	4403.61	4396.36	7.25	11.0	3.75	1.84
	MW10	4400.79	4394.80	5.99	13.0	7.01	3.43
	MW15	4402.77	4395.27	7. 50	13.5	6.00	2.94
:	MW16	4404.17	4395.54	8.63	16.5	7.87	3.85
	MW17	4402.50	4395.64	6.86	14.0	7.14	3.50
ļ	MW18	4402.57	4395.51	7.25	14.5	7.25	3.54
	MW19	4404.11	4395.82	8.29	16.5	8.21	4.02



FILE COPY

Memorandum

To:

Robin Weesner

From:

Nevine Melikian, ERM-West.

Subject:

Soil Sampling, NVANG, May 15, 1995

Date:

May 2, 1995

This document outlines the details of soil sampling on May 15 through May 23, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. Soil samples will be collected from 24 soil boring at four sites (Sites 4, 5, 7, and 14) at the NVANG Base. The locations of the proposed soil borings are shown in attached figures. Optional borehole drilling (maximum 10 soil borings) and soil sampling may be required.

The purpose of soil sampling at 22 of the soil borings is to delineate the horizontal and vertical extent of soil contamination at the investigation sites. The remaining two soil borings are for the purpose of aiding in the design of a free product recovery system at Site 7.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Steve Becker, the Site Safety Officer, will ensure that all personnel present during fieldwork fill out the daily tailgate forms.

Soil Sampling Procedures

Borehole logging/sampling forms to be used during this investigation are attached to this memo. Once equipment decontamination procedures have been met, continuous drive samples will be collected using a 2-foot split-spoon sampler equipped with brass sampling sleeves.

Continuous drive samples will be collected from the interval between land surface to the target depth. All soil samples will be collected in the unsaturated zone. The thickness of the unsaturated zone will be determined based on geologic conditions and on ground water level measurements conducted at nearby monitoring wells during ground water monitoring activities. Confined conditioned exist at some locations at the NVANG. Where unconfined or water table conditions occur, soil borings will be terminated at the top of the water table. Where confined ground water conditions occur, the soil borings will be terminated at the bottom of the confining layer. It is anticipated that the maximum total depth of the soil borings will be approximately 10 feet below ground surface (bgs).

Samples collected from each drive sample interval will be field-screened using a PID and a portable field GC. Three samples from each soil boring, with the highest contamination levels as determined by field screening, will be submitted for laboratory analysis. If the results of the field screening do not clearly target a specific interval for laboratory analysis, samples collected from immediately below the surface fill material, from the middle of the borehole, and from the bottom of the borehole will be submitted for laboratory analysis.

The following figure shows the sampling scheme for the drive sampler. From each drive sample, the bottom-most sleeve will be submitted for laboratory analysis, and if applicable, the third sleeve from the top will be submitted as a field duplicate. If no duplicated sample is to be collected, the third sleeve from the top will be used for screening using the field GC, the second sleeve from the top will be used for litho-logging and for screening using a PID, and the top sleeve will be discarded. If a duplicated sample is to be collected, the second sleeve from the top will be used for screening using the field GC and the bottom half of the top sleeve will be used for litho-logging and for screening using the PID.

Drive Sampler Sampling Scheme

If a Duplicate Sample will be Collected

If no Duplicate Sample will be Collected

PID & Lithology	Discard
Field GC	PID & Lithology
Duplicate	Field GC
Laboratory	Laboratory

The ends of the brass sleeves for soil samples to be sent for laboratory analysis and for field GC screening will be covered with Teflon and with fitted plastic caps. Samples will then be labeled, placed in individual Gladlock bags, and stored on ice. Sample labels provided by the laboratory will be used for samples to be submitted for laboratory analysis. ERM sample labels will be used for samples to be screened using the field GC

Sampling Schedule

The following is a tentative schedule for borehole drilling and soil sampling:

May 15 and 16, 1995:

Site 4: Soil borings SB4-1, SB4-2, SB4-3, SB4-4,

SB4-5, SB4-6

May 17, 18, and 19, 1995: Site 7: Soil Borings SB7-1, SB7-2, SB7-3, SB7-4,

SB7-5, SB7-6, SB7-7, SB7-8

May 20 and 21, 1995:

Site 5: Soil Borings SB5-1, SB5-2, SB5-3, SB5-4

May 22 and 23, 1995:

Site 14: Soil Borings SB14-1, SB14-2, SB14-3,

SB14-4

This schedule may be altered due to site operations and/or sampling speed.

Soil Sample Identifiers

Sample identifiers for original soil samples will include the site number, soil boring number, and sample depth. For example, SB4-1-6 represents soil boring number one, at site 4, with the sample collected at 5.5 to 6 feet bgs...

Analytical Parameters

Soil samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8240;
- Semi-volatile organic compounds (SVOCs) using EPA Method 3550/8270; and
- Total petroleum hydrocarbons (TPH) using EPA Method 5030/8015 (standard JP-4 and Gas);

Soil sample analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical Att: Lora Dunlap 6310 Rothway Houston, Texas 77040-9835 (713) 690-4444

A validation package will be requested from GSA for eight field selected soil samples collected on May 17 and 19, therefore, a separate Chain-of-Custody form will be prepared for each of these samples. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Ouality Assurance/Ouality Control (QA/QC) Samples

The following QA/QC samples will be collected. Duplicate samples will be analyzed for the same parameters as the original samples. Equipment rinsate samples will be analyzed for VOCs using EPA Method 8240, SVOC using EPA Method 8270, and TPH using EPA Method 8015 (Standard JP-4 and Gas). Trip blanks will only be analyzed for VOCs using EPA Method 8240.

<u>Duplicate Samples.</u> Field duplicates will be collected at a frequency of 10 % of total number of original samples. Eight field selected duplicate soil samples will be collected from the following soil borings:

- Site 4: SB4-1 and SB4-4;
- Site 7: SB7-1, SB7-3, SB7-8;
- Site 5: SB5-2, SB5-4; and
- Site 14: SB14-2.

Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

<u>Trip Blanks.</u> Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/MSD will be designated for every 20 soil samples. MS/MSD will be requested for four field selected soil samples, one soil sample collected from each of soil borings SB4-2, SB5-1, SB7-5, SB7-6. This should be indicated on the Chain-of-Custody form.

Equipment Rinsate. Rinsate blanks from final rinse of drive sampler after decontamination will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the boring identifier at which the blank was prepared followed by an asterix.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry, if possible, and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

the drilling rig and flights will be decontaminated after use by steam cleaning.

Sampling Summary

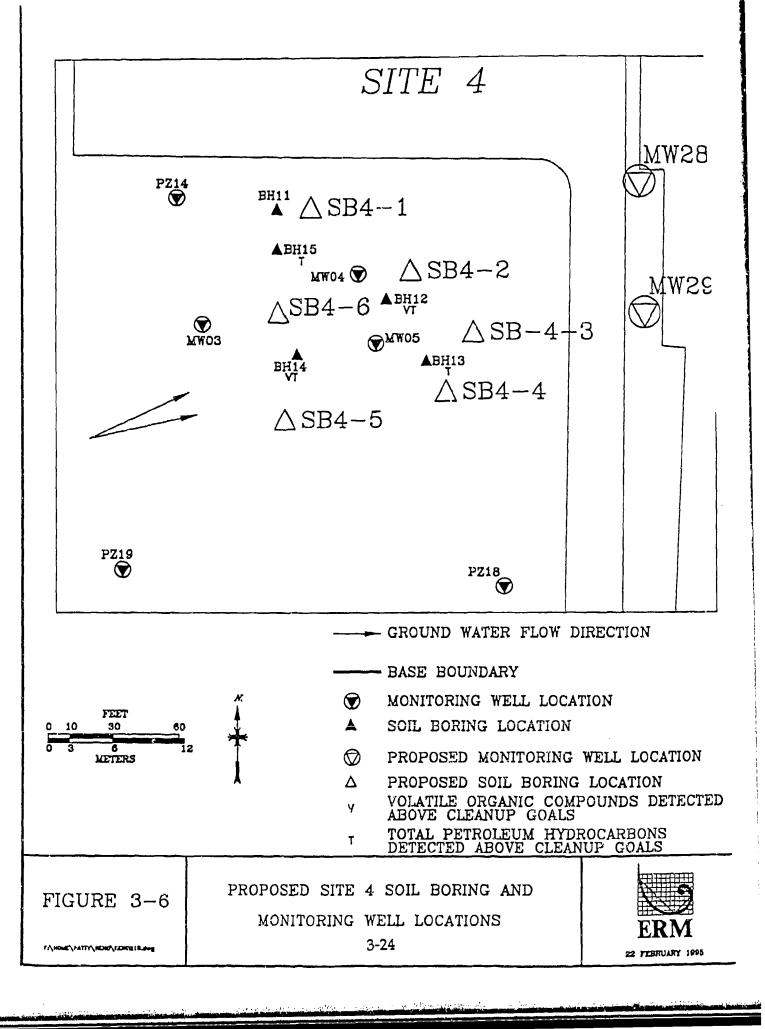
The following table summarizes the soil sampling program:

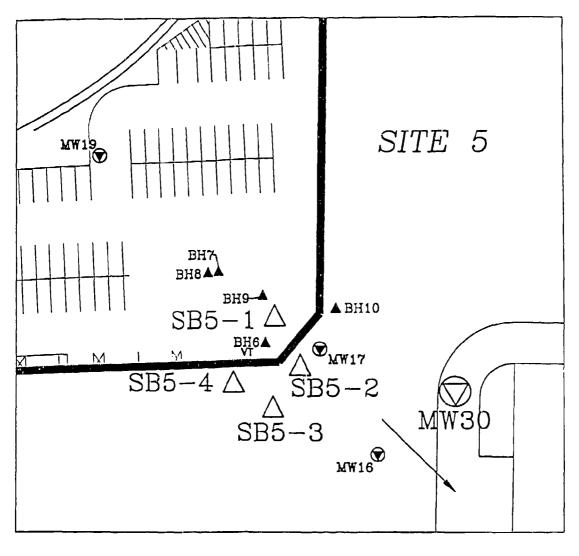
Matrix	Method	Container	Original Samples		Matrix Total			
				Field Dup	MS/MS D	Equipment Rinsate	Trip Blank	
	VOCs (8240)							
Soil	SVOCs (8270)	Brass Sleeve	72	8	4			80
	TPH (8015) (Standard JP- 4 & Gas)							
	VOCs 8240	2X40 ml glass				4	8	12
Water	SVOCs 8270	2X1000 ml glass				4		4
	TPH (8015) (Standard JP- 4 & Gas)	2X40 ml glass				4		4

Required Equipment and Materials

- Brass sleeves
- Teflon film
- Plastic caps
- Photoionization detector (PID)
- Portable Gas Chromatograph (GC)
- Coolers
- Pesticide grade methanol
- ASTM Type I reagent water
- Alconox or Liqui-Nox
- Aluminum foil

- Borehole logging/sampling record
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan





- GROUND WATER FLOW DIRECTION

BASE BOUNDARY

- MONITORING WELL
- ▲ SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- Δ PROPOSED SOIL BORING LOCATION
- VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
 - TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

FIGURE 3-11

PIL HOW (PATTY MENGY MENG

25

FEET

50

METERS

20

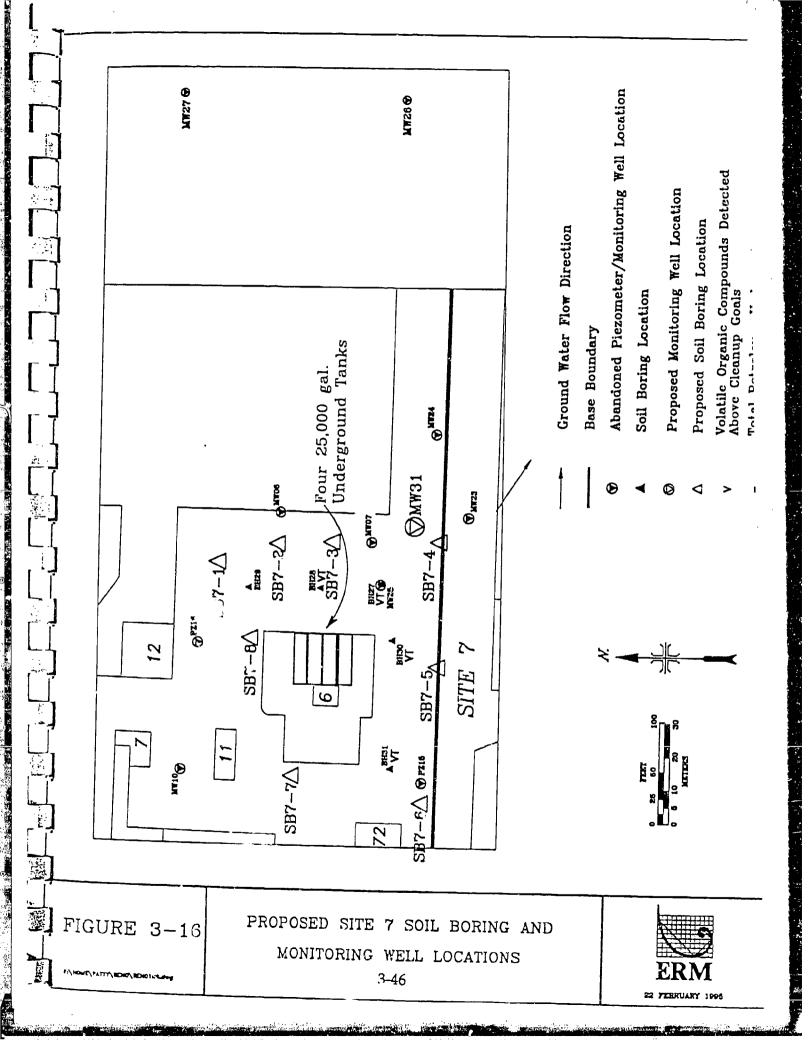
100

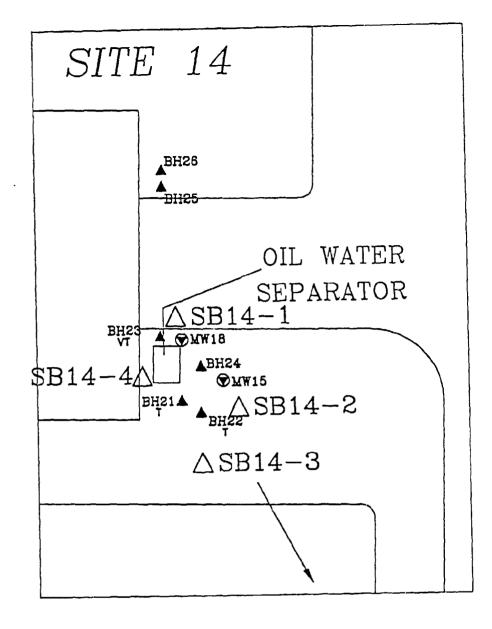
30

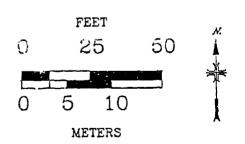
PROPOSED SITE 5 SOIL BORING AND
MONITORING WELL LOCATIONS
3-34



22 FEBRUARY 1995







GROUND WATER FLOW DIRECTION

- ▲ SOIL BORING LOCATION
- MONITORING WELL LOCATION
- Δ PROPOSED SOIL BORING LOCATION
- VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
- TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

FIGURE 3-21

PROPOSED SITE 14
SOIL BORING LOCATIONS

3-56



22 FEBRUARY 1995

FI/HOME/PATTY/MENO/MENOLOGICATING

Depth, feet bgs		
Borehole I	Borehole Logging and Sampling Form Date: Date:	1 1
	rag Notes By: Lithologic Information	Page of: By::
	Color: Moisture Content: Dry, Slightly Moist, Moist,	st,
	Textural Classification:	.
	Clay Sizes Plasticity Sizes Plasticity Sizes Plasticity Sizes Plasticity Silt Sand Sand Sand Sand Sand Sand Sand Sand	city
	Induration: Poor, Moderate, High Sorting: Poor, Fair, Good, Very Good Consistency: FG Sediment - Soft, Firm, Stiff CG Sediment - Loose, Dense, Hard USGS Designation: Sample PID Reading:	
Drive Sampler Sampling Scheme	Odor:Staining:Notes:	
Drive Information	Sampling Information	
Depth Interval to feet bgs Blows: Recovery, feet: Notes:	Collection Time: Sample Identification: QA/QC Sample: Laboratory: Gulf States Analytical, Inc., Houston, Texas Analyses to be performed: VOCs (8240), SVOCs (8270), TPH (8015) std. JP-4 and Gas Notes:	
PID Air Monitoring: Ambient Air: pom/time.	opm/time. Breathing Zone: ppm/time, Borehole:ppm/time	

Memorandum

FILE COPY

To:

Robin Weesner

From:

Nevine Melikian, ERM-West.

Subject:

Ground Water Resampling, NVANG, July 12 & 13, 1995

Date:

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July 3, 1995

This document outlines the details of ground water resampling on July 12 and July 13, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. Ground water will be resampled at 7 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figures.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). The Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, Sp. condition, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

May 12, 1995:

MW04, MW05, MW28, MW29

May 13, 1995:

MW32, MW30, MW24

This schedule may be altered due to site operations and/or sampling speed. MW32 is located on Reno-Tahoe Airport property. If access gate is locked, contact Mike Anderson at Airport Operations (702) 328-6490. In the case of access problems to monitoring wells located on the base, contact Major John Peck at (702) 788-4503.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the second sampling round). For example, MW03-95-2 represent a ground water sample collected during the second round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

• Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;

Ground water analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical Att: Lora Dunlap 6310 Rothway Houston, Texas 77040-9835 (713) 690-4444 Ship samples at the end of the sampling program; it is not necessary to ship every day. Include 48 hour turnaround time on Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

<u>Duplicate Samples.</u> Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring well MW29. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

<u>Trip Blanks</u>. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from monitoring well MW32. This should be indicated on the Chain-of-Custody form.

<u>Field Blanks</u>. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or

Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

Analysis	Method	Container	Sampling Locations		Total Sampie:				
				Field Dup	MS/MS D	Equip Rinse	Trip Blank	Field Blank	
VOCs	8010/8020	2 X 40 ml glass	7	1	1	1	2	1	12

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and real
- Water level meter
- Photoionization detector (PID)
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Non-disposable bailer
- Alconox or Liqui-Nox
- Aluminum foil

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- Sampling bottles and ccolers (will be shipped by the lab to Sacramento)
- ASTM Type I reagent water (available in storage shed at NVANG)
- Pesticide grade methanol (available in storage shed at NVANG)

Arizona Office Responsibility:

- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan

NVANG Well Volume Information

Date of Measurement	Well Number	Casing Elevation (ft)	Head Elevation (ft) 9/94	Depth to Water (ft below measuring point)	Casing Depth (ft)	Saturated Interval (ft)	3 Casing Volumes (gal)
May, 1995	MW04	4403.69	4397.86	5.83	16.05	10.22	30.66
	MW05	4403.61	4397.96	5.65	10.20	4.55	13.65
	MW24	4398.67	4393.92	4.75	15.10	10.35	31/05
	MW28	4404.03	4397.55	6.48	17.96	11.48	34.44
	MW29	4404.05	4397.75	6.30	18.42	12.12	36.36
	MW30	4404.48	4397.21	7.27	18.40	11.13	33.39
	MW32	4401.89	4397.21	4.68	19.05	14.37	43.11

Memorandum

To:

Robin Weesner

From:

Frank Lamphere, ERM-West.

Subject:

Ground Water Monitoring, NVANG, August 21-25, 1995

Date:

August 18, 1995

This document outlines the details of ground water sampling on August 21 through August 25, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On August 21 through August 25, ground water will be sampled at 21 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figure. All changes from procedures used during the May/July 1995 sampling round will be denoted in bold print.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Frank Lamphere, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, conductivity, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25, MW07, T-1, T-2, T-3, and T-4 will be recorded. If the thickness is measurable and a sample is to be collected, floating product will be removed using a dedicated product removal disposable bailer. Monitoring wells MW25, MW07, and T-4 will be sampled last. NOTE: ground water samples will not be collected from wells T-1 through T-3.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

August 21, 1995: MW15, MW18, MW17, MW30, MW32

August 22, 1995: MW08, MW27, MW26, MW24, MW23

August 23, 1995: MW28, MW29, MW03, MW04, MW05*

August 24, 1995: MW10, MW06, MW31*

August 25, 1995: MW25, MW07, T-4

This schedule may be altered due to site operations and/or sampling speed.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the third sampling round). For example, MW03-95-3 represent a ground water sample collected during the third round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;
- Semivolatile organic compounds (SVOCs) using EPA Method 3550/8270;

- Extractable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015;
- Purgable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015; and
- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Quanterra Analytical Services (QAS). Ground Water Samples will be shipped by Federal Express to QAS:

Quanterra Analytical Services Att: Tracy Sidwell 1721 South Grand Ave. Santa Ana, CA 92705 (714) 258-8610

A validation package will be requested from QAS for ground water samples collected from monitoring well MW07 and MW31 therefore, a separate Chain-of-Custody form will be prepared for MW07 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

<u>Duplicate Samples</u>. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring wells MW05 and MW31. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

<u>Trip Blanks</u>. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB082195-1 represents the first trip blank collected on August 21, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from

monitoring well MW05. This should be indicated on the Chain-of-Custody form.

<u>Field Blanks</u>. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type II reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

EPA Method	Description	Matrix	Number of Samples	Extras for Breakage	Total	Container Type
7420	Total Lead	W	28	2	30	500ml poly
8010/8020	VOCs	W	28	2	30	3x40ml gls
8015M	TPH Extractables-JP4/Gas	W	28	2	30	2x1L gls *
8015M	TPH Volatiles-Gasoline	W	5	1	6	3x40ml gls
8270	SVOCs	W	28	2	30	2x1L gls *
8010/8020	Trip Blank	W	5	2	7	40ml glass

^{*-1}x1L gls for MS/MSD

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and reel
- Water level meter
- Photo ionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Alconox or Liqui-Nox

Arizona Office Responsibility:

- Pesticide grade methanol (already on site)
- Sampling bottles and coolers (shipped to NVANG)
- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan
- Ultra pure water machine
- Peristaltic pump and disposable filter cartridges
- Arrangement for 55 gallon drums

FILE COPY

Memorandum

To: Robin Weesner and Dave Betts

From: Frank Lamphere

Subject: Ground Water Monitoring, NVANG, November 13-17,

1995

Date: November 7, 1995

This document outlines the details of ground water sampling on November 13 through November 17, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On November 13 through November 17, ground water will be sampled at 21 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figure. All changes from procedures used during the August 1995 sampling round will be denoted in bold print.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Dave Betts, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Level Round

A ground water level round will be performed prior to the collection of any ground water samples. Depth to ground water should be measured in all wells on the first day. The only wells which can be excluded from this round are the wells first on the sampling list (see list). The depth to ground water can be recorded when these wells are sampled.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using electric water level meter. Ground water level and

all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, conductivity, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25, MW07, T-1, T-2, T-3, and T-4 will be recorded. If the thickness is measurable and a sample is to be collected, floating product will be removed using a dedicated product removal disposable bailer. Monitoring wells MW25, MW07, and T-4 will be sampled last. NOTE: ground water samples will not be collected from wells T-1 through T-3.

Depth to ground water measurements will be taken at all wells, including wells where no samples are collected. This is to ensure that an accurate ground water surface contour can be drawn.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

November 21, 1995: MW15, MW18(duplicate)*, MW17, MW30,

November 22, 1995: MW08 (MS/MSD), MW27, MW26, MW24, MW23 IS

November 23, 1995: MW28, MW29, MW03, MW04, IVMW05(duplicate)*(MW04, MW04, MW05)

November 24, 1995: (dw)MW10, MW06(CLP), MW31(CLP)

November 25, 1995: MW25, MW07, T-4 (MS/NO)

This schedule may be altered due to site operations and/or sampling speed.

NOTE: Purge water from wells MW05, MW06, MW07, MW17, MW25, and T-4 must be stored in the same 55-gallon drum.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the fourth sampling round). For example, MW04-95-4 represent a ground water sample collected during the fourth round of quarterly sampling in 1995 from monitoring well MW04.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;
- Semivolatile organic compounds (SVOCs) using EPA Method 3550/8270;
- Extractable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015;
- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Quanterra Analytical Services (QAS). Ground Water Samples will be shipped by Federal Express to QAS:

Quanterra Analytical Services Att: Tracy Sidwell 1721 South Grand Ave. Santa Ana, CA 92705 (714) 258-8610

A validation package will be requested from QAS for ground water samples collected from monitoring well MW06 and MW31 therefore, a separate Chain-of-Custody form will be prepared for MW07 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

<u>Duplicate Samples.</u> Field duplicates will be collected at a frequency of 10 % of total number of original samples. **Duplicate ground water samples will be collected from monitoring wells MW05 and MW18** Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

<u>Trip Blanks</u>. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB111395-1 represents the first trip blank labeled on November 13, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from monitoring well MW08. This should be indicated on the Chain-of-Custody form.

<u>Field Blanks</u>. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute. Field blanks will be collected at MW26 and MW10.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute. Equipment rinsate blanks will be collected at MW30 and MW03.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type II reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sam program:

EPA Method	Description	Matrix	Number of Samples	Extras for Breakage	Total	Container Type
7420	Total Lead	W	28	2	30	500ml poly
8010/8020	VOCs	W	28	2	3 0	3x40ml gls
8015M	TPH Extractables-JP4/Gas	W	28	2	30	2x1L gls *
8270	SVOCs	W	28	2	30	2x1L gls *
8010/8020	Trip Blank	W	5	2	7	40ml glass

^{*-1}x1L gls for MS/MSD

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and reel
- Water level meter
- Photo ionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Alconox or Liqui-Nox

- Peristaltic pump and disposable filter cartridges
- 55-gallon drums
- Interface probe

Arizona Office Responsibility (shipped to Dave Betts or Base):

- Pesticide grade methanol (already on site)
- Sampling bottles and coolers (shipped to NVANG)
- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan
- Ultra pure water machine
- Peristaltic pump filters

September 19, 1995

1777 Botelho Drive Suite 260 Walnut Creek, CA 94596 (510) 946-0455 (510) 946-9968 (Fax)

Mr. Mike Frey ANGRC/CEVR 3500 Fetchet Avenue Andrews Air Force Base Maryland, 20331-5157



Subject: Contract DAHA90-94-D-0014

Delivery Order 0017 Pilot Study Report

Reno Air National Guard Base

Dear Mr. Frey:

ERM West, Inc., (ERM) has completed the work for the above referenced delivery order. We are pleased to submit this Pilot Study Report in accordance with Task 2 of the delivery order. Three copies of this document are being transmitted to Major John Peck at the Reno Base.

Background

In March 1995, the Air National Guard Readiness Center (ANGRC) requested ERM to conduct a Treatability Study at the Nevada Air National Guard Base (referred hereafter to as the Base). The Treatability Study included installation of observation wells and product recovery equipment to initiate the Treatability Study at Site 7 of the Base.

Site 7, a petroleum, oil, and lubricant (POL) storage facility, consisted of four 25,000-gal underground JP-4 fuel tanks that were used for flight line operations and ancillary equipment. Numerous small JP-4 fuel spills had occurred around the backfill area above the tanks between 1973 and 1985.

During initiation of the Treatability Study, more than 6 feet of product was found floating on the groundwater table. This amount of product was more than ERM had anticipated since the amount seen in a monitoring well prior to the Study was consistently less than a foot. ERM estimated that 20,000 gallons of jet fuel were floating on the groundwater surface within the backfill area.

Upon discovery of this amount of product, ERM proposed an alternative method to quickly and cost-effectively remediate the site. In July 1995, ANGRC had contracted ERM to conduct a Pilot Study to initiate the

additional remediation. The Pilot Study was to include installation of three eight-inch extraction wells, removal of the product from the wells, and the disposal of the product.

Well Installations

ERM contracted West Hazmat Drilling Corp to install the three eight-inch extraction wells at Site 7. From August 21 to August 22, 1995, West Hazmat Drilling Corp, under the supervision of an ERM field engineer, installed extraction wells T-5, T-6, and T-7 within the backfill area. The locations of these extraction wells are shown in Drawing 6017.10-01. The drilling logs are attached in Appendix A.

Extraction Well T-5 was screened from 3.5 feet to 13.5 feet below ground surface; Extraction Well T-6 was screened from 4 feet to 14 feet below ground surface; and Extraction Well T-7 was screened from 4 feet to 11 feet below ground surface.

The initial product thickness observed in Extraction Well T-5 was 2.73 feet; product thickness observed in Extraction Well T-6 was 5.3 feet; and product thickness observed in Extraction Well T-7 was 5.3 feet.

Product Removal

ERM had contracted Americlean, Inc., (Americlean) to remove and recycle the petroleum product overlying the groundwater surface. Americlean provided a 5,000-gallon tank truck to Site 7 for each working day from August 23 to September 7, 1995. Americlean utilized a vacuum pump attached to the tank truck to extract from the three eight-inch wells. The purpose of having three extraction wells was to enable continuous operation. When the initial product layer within a well was completely extracted, extraction was switched to another well to enable product to recover in the original well. A three-way manifold was installed at the three extraction wells for ease of operation. Whenever a well was pumped dry of product, the valve positions at the manifold were altered to allow extraction from another well.

An ERM field engineer was on site to supervise the activities and to make certain no groundwater was extracted. Table 2 presents the volume of product extracted during the ten days of operation. A total of 10,008 gallon of product was extracted from the three wells. The product thickness in Extraction Well T-5 was decreased from 2.73 feet to 0.60 feet; product thickness in Extraction Well T-6 was decreased from 5.30 feet to 1.10 feet; and the product thickness in Extraction Well T-7 was decreased from 5.3 feet to 1.5 feet.

According to the data collected during extraction, it was noted that the recovery rate for the first few hours was faster than recovery later in the day. The recharge time was approximately 15 to 20 minutes for the first three hours and extended to about 30 to 40 minutes later in the day. The faster recovery of product provided a greater extraction rate. Based on this data, ERM chose to divide the last few days of extraction into half days to take advantage of the faster recovery rates.

The extracted product was hauled off site each day to Americlean's processing plant in Silver Spring, Nevada. The Silver Springs facility is a permitted waste oil recycling facility.

Please contact me at (510) 946-0455 if you have any questions or comments regarding this document.

Sincerely,

ERM-WEST, INC

James E. Quinn, P.E Program Manager

FTW/ftw/6017.10

Attachments:

Table 1 - Product Thickness Measurements

Table 2 - Volume of Product Extracted during Pilot Study

Drawing 6017.10-01

Appendix A

cc: Major John Peck, 152nd TAC Clinic/EM

Ms. Jeanie Kampschroeder, NGB-AQC-E (transmittal letter only)

Table-1 Product Thickness Measurements during Pilot Study

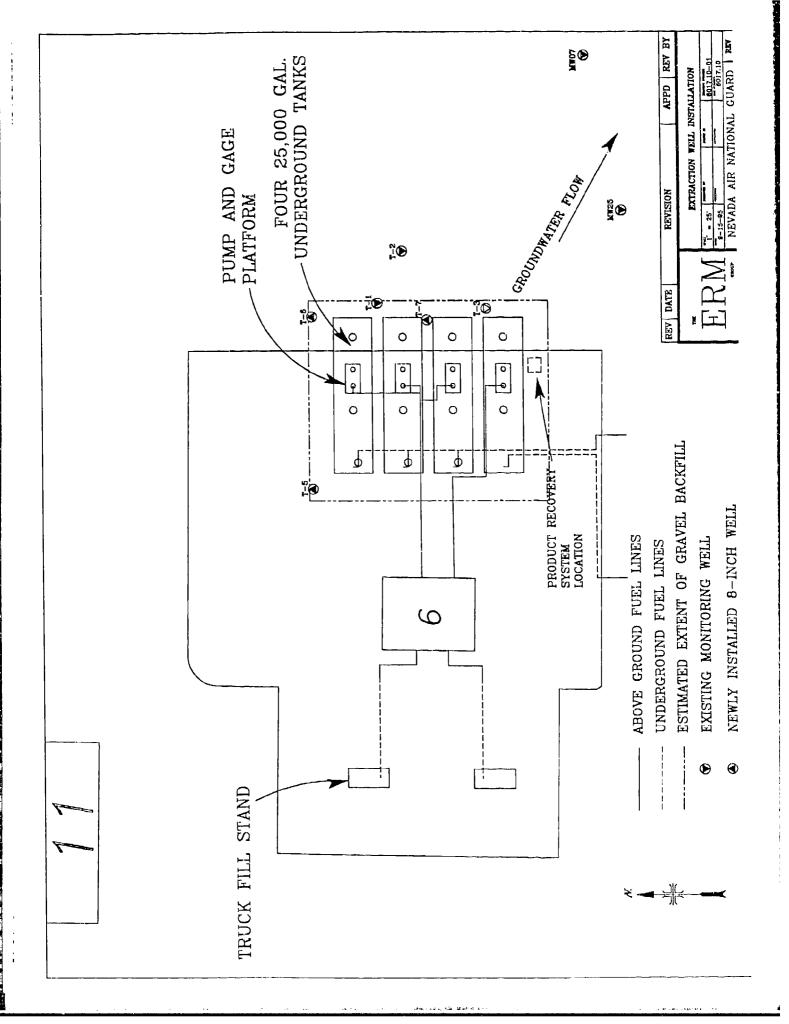
Date	T-5 Product Thickness (ft.)	T-6 Product Thickness (ft.)	T-7 Product Thickness (ft.)
			"
8/23/95	2.73	5.30	5.30
8/24/95	3.50	3.84	4.64
8/25/95	2.68	2.95	4.20
8/29/95	3.00	3.50	3.50
8/30/95	2.00	2.00	3.50
8/31/95	1.80	2.00	3.00
9/1/95	0.60	1.10	1.50

AND THE REPORT OF THE PROPERTY

Table-2 Volume of Product Extracted during Pilot Study

Date	Volume of Froduct Extracted (gallons)	Average Hourly Extraction Rate (gallons /hr)
8/23/95	1,959.0	326.5
8/24/95	1,876.0	229.3
8/25/95	1,125.0	153.4
8/29/95	950.0	158.3
8/30/95	1,256.1	158.4
8/31/95	839.0	110.6
9/1/95	540.0	148.5
9/5/95	910.3	114.0
9/6/95	227.6	114.0
9/7/95	325.0	162.5

Total = 10,008



APPENDIX A

DRILLING LOGS

ENVIRONMENTAL RESOURCES MANAGEMENT	4
FIELD WELL COMPLETION FORM	CHRISTY SOX
Location: RENO - ANEI OWNER AIR NATIONAL GAURD Location: RENO - NEVADA 100 = GOLT 10 Location: Reviewed Project Day 1 100	STEEL CONDUCTOR CASING
Vell T-5 Driller: MIKE LESTER Ders of Installation: 8-22-95 Hours Drilled:	HOREHOLE POPE
Equipment 15 Iach Hellow Stein Auger Iach Rolley Wash	DEACK CEMENT SAND
Callens of Water Used During Drilling: ~ (O Gallest ~ (O	10-10-101
Method of Decontamination NA	TOP OF CASING AT
Well Perroje or: NA Lisulas Agency; NA DEVELOPMENT Method of Development NA	0.25 FEET ABOVE/AT/ (BELOW)GROUND LEVEL 15 INCH DIAMETER 60RENDLE 0 14.5 Het 8 INCH DIAMETER 55HEDULE AND EVE
Development Began Date: NA Time: NA Depth to Water Before Development NA Feet	BLANK CASING O 10 3.5 feet
Yield: Time: Date: Yield: Time: To Yield: Time: To Oph From: To Oph From: To Oph From: To Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph Oph	BENTONITE-CRMENT SEAL OR BESSACK CEMENT-SAND SEAL O 10 2 1001
Total Water Removed During Development NA Gallons Description of	DENTONITE PELLET SEAL 2 10 3 1000
Turbidity at End of Development Odor of Water 1D-4 PRODET FLOATING	LONESTAR 2 SAND PAGK 3 to 14 feet
Water Ground Surface STank Treek Direharged Storage Tank Tes Other	SLOTTED (O.DIO
Depth to Water After Development NA Feet Well Development Complete: NA Well Elevation: Feet	3.5 to 13.5 feet INCH DIAMETER SCHEDULE 40 PVC
MATERIALS USED (0 Seeks of #2/12 LONE STAR Sand	BOTTOM WELL CAP
Sects of Const Used	HOLE CLEANED OUT TO
Sacks of Powdered Boatonis Powads of Dentonise Polisis	14 1001
5 Feet of 8 Inch PVC Black Casing	14 1000 OF BOREHOLE
10 Feet of 8 look PVC Stated Server Feet of lock Steel Conductor Casing	NOT TO SCALE
Yerd Cemen-Sand (Redi-Mia) Ordered	ADDITIONAL INFORMATION:
Yurd Coment-Sand (Redi-Mix) Used	THIS WELL IS LOCATED WEAR
Cestrate Pumper Used? NoYes	THE NW CORNED OF EXCAVATED
, Name	AREA.
Well Cover Used Locking Steel Cover Diversified Well Products Beg Christy Box Other	
Sili Trap Cred? X No Yes	

ERIT ELECTRICAL CONTRACTOR CONTRA

Silt Tran Card' __ X. _ N . Yes

Silt Trap Used* ____ No ___ Yes

ERM-WEST	ECHRISTY BOX
FIELD WELL COMPLETION FORM	T LOCKING STEEL COVER
Name RENO - ANG OWNER AIR NATIONAL GAURD Location: RENO - NEUADA Jobs: 6017:10	STEEL CONDUCTOR
Logged AFF Br. Hanger ROBW WEENER	
Well Number: T-7 Driller: MIKE LESTER	BOREHOLE
Date of Installation: 8-22-95 Hours Drilled:	totout
Par formers	BENTONITE-CEMENT
lach Hollow Stem Auger lach Romey Wash	BAACK CEMENT AND
Callens of Water Used During Drilling: ~ 10 Galloux _ ~ 10	
Method of Descargational Prior to Drilling:	TOP OF CASING AT
Well Parmit # NA Listving Agency: NA	GELONGHOUND LEVEL
DEVELOPMENT	BOREHOLE
Method of Development NA	0 to 11.2 feet
Development Began Date: NA Time: NA	SCHEDULE 40 PVG BLANK CASING
Depth to Water Before Development NR Feet	D 10 4 1001
Yield: Time: Date:	SEAL OR
Yink Date GPM From: To)) SEAL
Total Water Removed	BENTONITE PELLET
During D velopment NA Gallons Description of	SEAL 2 10 3 (est
Turbidity at End Clear Slinbtly cloudy of Development Mod. Turbid Yery Muddy	LONESTAR #2
Odor of Water NA	SAND PACK 3 to 11.2 (see
Water Ground Surface Z Tank Truck Discharged Storm Saware	8 INCH DIAMETER
To: Drume Other	SLOTTED (O O O O Inch) SCREEN
Depth to Water After Development NA Feel Well Development Complete: NA	4 10 11 1001
Well Elevation: Feet Measuring Polot (Le, Top of Casing);	
MATERIALS USED 5 September #2/12 / 20/55700	BLANK STEE TRAP
5 Secks of #2/12 LONESTAR Send Secks of	BOTTOM WELL CAP
Galless of Groat Used	11: 2_ 1eex
Sacks of Fowdered Beatonite	HOLE CLEANED OUT TO
Pounds of Denguise Pallets	BOTTOM OF BOREHOLE
5 Feet of 8 Inch PYC Blank Casing	11.2 1000
Feet of 8 Lack PYC Statted Screen	NOT TO SCALE
Frest of lock Steel Conductor Caulag	ADDITIONAL INFORMATION:
Yeld Cement-Sand (Redi-Mix) Ordered	THIS WELL IS LOCATED BETWEEN
Yard ³ Coment-Sand (Redi-Mix) Used Concrete Pumper Used? No Yes	2 LARGE UP-8 TANKS ON THE
NomeYes	WEST SIDE OF THE FENCE
	And the second s
Well Cover Used: Locking Steel Cover Diversified Well Products Boz Christy Box	

APPENDIX B

FIELD GC RESULTS

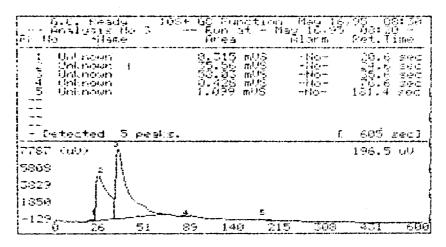
black black

G.C. Ready Analysis No 1 k tio flame ! Unknown ! Unknown ! Unknown ! Unknown	<u>.</u>	291 102	els mus mus mus mus mus	May 16 au 16, 95 Alarm -No- -No- -No-	07:37 Ret.1 26:4 26:4	3
- Detected 4 peaks	s		· · · · · · · · · · · · · · · · · · ·		605 226.5	
500 000 00 12	34 11					
9 26 51	89	140	21	5 308	431	

Syringe Slank A

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		_		
		τ	605	se¢1
		 Magazia Personal Personal Personal Personal Personal Personal Personal Personal Personal Personal Personal Per	178.5	. UU
		 110 215 70	440 745 700	140 215 700 401

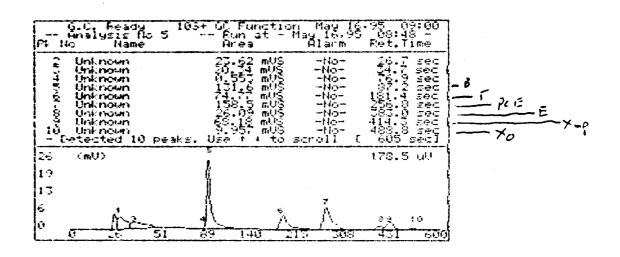
Fyringe blank B



Method blank

G.C. Ready 105- Analysıs No 4 Fk No Name	GC Fui - Run Area	nction at - N	May 16 ay 16,95 Alarm	.95 0 08:3 Ret.T	3:42 ime
1 Unknown 2 Unknown 3 Unknown 4 Unknown	10.55 36.65 51.793	あ ひら あ ひら の ひら が ひら	-No- -No- -No- -No-	24.1 26.4 25.6 102.6	500 500 500 500
- Detected 4 peaks.			C	503	sec1
9215 (dd) 6389 4560 2231		4		229.0	u∪
	9 14	211	ত ভাগ	431	600

50.5/L



500mg/L 50ml

G.C. Ready 187 Amalysis No 6 % No Mame	S+ GC Function Run at - M Area	May 16 lay 16.95 Mlarm	.95 09:15 09:02 Ret.Time
3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 10 Unknown 11 Unknown 11 Unknown 1 peaks	3.65 mUSS mUSS mUSS mUSS mUSS mUSS mUSS mUS	-No- -No- -No- -No- -No- -No- -No- -No-	26.3 sec 54.6 sec 447.4 sec 181.6 sec 181.6 sec 2534.0 sec 414.3 sec 414.3 sec 405 sec
1.23 (mU) 92 51	7	ş	208.5 uV
30 12 4 5	1 A	_ /_	910 11

	+ 60 Fu Run - Area	at - May	May 16, 16,95 Narm	95 89 89:22 Ret.Ti	137 me
1 Unknoun 2 Unknoun 3 Unknoun 	0,205 59,00 3,396	mUS mUS mUS	-No- -No- -No-	21.5 25.6	sec sec sec
			C	605 s	
1493 2130					
<u> </u>	89 14	0 215	308	नडा	न्ह

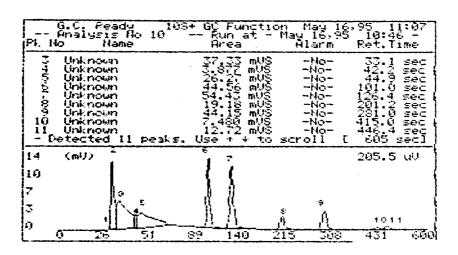
203-95-2 100-l

0.0. Peadu 105. Analysis No 8 - FL No Name	GC Fun Run Ares	nction at - Ma	May lo. y lo.95 Alarm	95 10 10:0- Ret.T	1:14 1 -
1 Unknown 3 Unknown 5 Unknown	12.21 23.55 24.25	か ひら かりら おりら	-140- -140- -140-	24.60 25.8	300 500 500
- Detected 3 peaks. 7831 (UU)	in the state of th	19-19-18-18-18-18-18-18-18-18-18-18-18-18-18-	ŗ	582 203.5	
5873 3915 1957					
0 0 26 51 8	39 14	0 215	্য ক্র <u>া</u> ড	- वजा	56

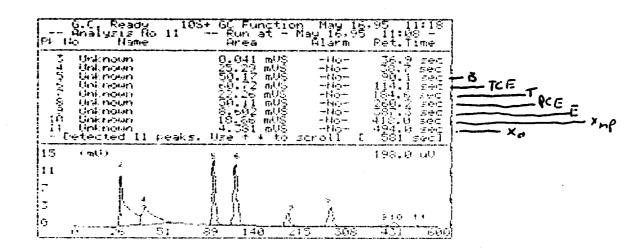
1008-95-2

6.C. Ready Analysis No 9 k No Name	1887 GC R A	Function un at - P Mea	າ May 16 May 16,95 Alarm	.95 10 10:2 Ret.Ti	(:42 me
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown	0.46.00 0.46.0	091 mUS .62 mUS 821 mUS .24 mUS .055 mUS .407 mUS	-No- -No- -No- -No- -No- -No-	7.14.008428 3546579 12	2002 2002 2000 2000 2000 2000 2000 200
7 Unknown	4.	497 mUS	-140,1-	12.740	20.00
7 Unknown TI - Detected 7 pea		497 MVS			
		497 MVS			ecl
 - Detected 7 pea		497 MVS		566 s	ecl
== - Detected 7 pea 33 (mU)		497 MVS		566 s	ecl
TDetected 7 pea (mU)		497 MVS		566 s	ecl

songle 100 - R



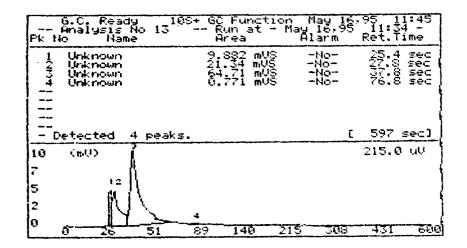
50-3/L 100 L



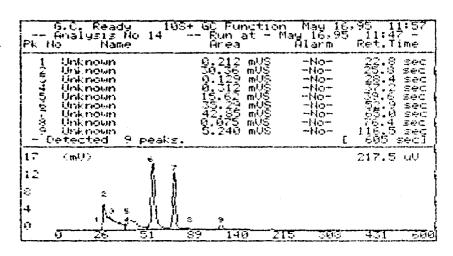
500mg/L 50ml

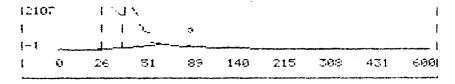
71	G.C. Rea Analysis No Na	ojų j No 12 me	93+ 60 F Run Are	unction at - M a	May 1 lay 16.9 Alarm	6.95 11:3 5 11:21 - Ret.Time	
	Uni nown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Onknown Onknown Onknown	1	00000000000000000000000000000000000000	3 mUS mUS mUS mUS mUS mUS mUS mUS mUS	-No- -No- -No- -No- -No- -No- -No- -No-	0.004000000000000000000000000000000000	nuonana
95 71 47 23	CHH)			7	& :	205.5 uV	
o	12 5 ZE	9 4 51	 	40 <u>/1</u> 21		910 11 431 61	30)

MW03-95-2

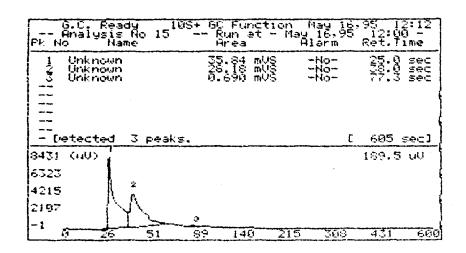


MWOB-95-2

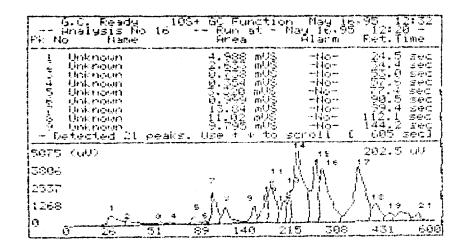




584-1-1.5 100,2 100,9



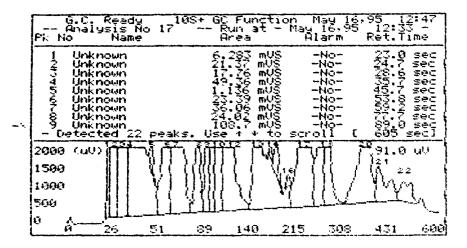
564-6-10 10 ml 12.09



G.C. Ready 10: Analysis No 16 Ft: No Name	+ GC Functio Rum at - Area	n May lê May 16,95 Alarm	.95 2:32 12:20
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unknown 17 Unknown 17 Unknown 18 Unknown 18 Unknown 18 Unknown 18 Unknown	19.05 mU00 70.041 mU00 70.441 mU00 11.4014 mU00 11.4014 mU00 10.441 mu00 10.4	-No- -No- -No- -No- -No- -No- -No- scroll	40000000000000000000000000000000000000

G.C. Ready Analysis No Pk No Hame	108+ GC Function May 16, 16 Run at - May 16,95 Area Alarm	98 12:33 12:20 - Ret.Time
13 Unknown 14 Unknown 15 Unknown 16 Unknown 17 Unknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 21 Unknown	84.44 mUS -No- 131.8 mUS -No- 31.05 mUS -No- 12.68 mUS -No-	00000000000000000000000000000000000000

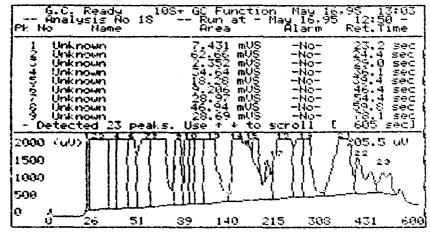
4w06-95-2 200 ml

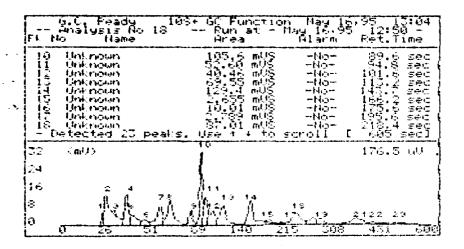


G.C. Ready 188 - Analysis No 17 FV No Name	r GC Functio Fun at - Area	n May 16 Nay 16,95 Alarm	,95 12:48 Ret.Time
18 Unknown 11 Unknown 12 Unknown	47.89 mUS 52.45 mUS 61.19 mUS 115.1 mUS	-No- -No- -No- -No-	94.1 sec 101.0 sec 112.8 sec
13 Ontroon 14 Unknown 15 Ontroon 16 Ontroon 17 Unknown 18 Unknown	1.610 mVS 1.892 mVS 1.813 mVS	-140- -140- -140-	145.4 Sec 145.4 Sec 145.0 Sec
17 Unknown 18 Unknown - Detected 12 peaks.	78.25 mUS 46.61 mUS Use + + to	-Ho- -No- scroll [210.0 sec 201.7 sec 505 sec
31 (mU) 23 (\$		182.5 00
15	∦ 10 12 10		
	**************************************	6/1. 15 396	2021 22 431 800

G.C. Readu II	08+ GC Function	hay 16	.95 12:49
Aralysis No 17	Run at - N	lay 16,95	12:33
Pk No Name	Area	Alarm	Ret.Time
14 Unknown 15 Unknown 16 Unknown 18 Unknown 18 Unknown 20 Unknown 21 Unknown 21 Unknown 22 Unknown 22 Unknown 23 Unknown 24 Unknown 25 Unknown 26 Peak	1.610 mUS 7.8612 mUS 1.86125 mUS 1.8.451 mUS 461.49 mUS 87.449 mUS 87.442 mUS 5.03.4 to 8	-No- -No- -No- -No- -No- -No- -No- scroll [1.000000000000000000000000000000000000

MW06-95-2* 200 pl





Analysis flo 18 Pk No Name	+ GC Functio Run at - Area	n May 15 May 16,95 Alarm	.95 (3:05 12:50 - Ret.Time
15 Unknown 16 Unknown 17 Unknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 22 Unknown 23 Unknown 23 Unknown 25 Unknown 25 Unknown 25 Unknown	2.655 mUS 10.656 mUS 20.756 mUS 20.756 mUS 20.216	-No- -No- -No- -No- -No- -No- -No- scroll [0.000000000000000000000000000000000000

984-1-3.5 100-6 10.59

G.C. Ready 189 Analysis No 19 FK No Name	R	Funct un at rea	ion May - May 16, Alarm	95	95 13 13:10 Ret.Ti	19 me
1 Unknown 2 Unknown 	32 22.	.62 mU: .81 mU:	S -No- S -No-		24.1 36.6	50C 50C
- Detected 2 peaks.			a the state of the pro-	Ĺ	563 s	
6759 4506 2250 \rightarrow \frac{2}{\text{\chi}}						
$0 \qquad \frac{1}{51} \qquad \frac{1}{51}$	89	146	215 38	3	431	600

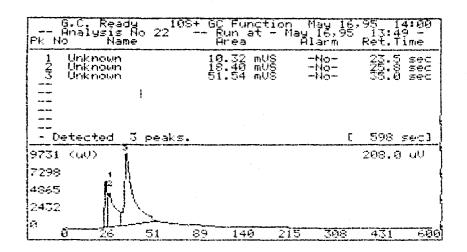
100.1 100.1

0.0. Readu (954 Analysis No 10 Pl No Name	GC Fu - Run Area	a たー・何:	May 16 ay 16,95 Alarm	1.0:2	3:35 1me
1 Unknown 2 Unknown 5 Unknown	12:12 17:04 45:56	mUS mUS mUS	-140- -140- -140-	24.7 36.8	
- Cottected I peaks.			C	561	sec]
6350 (00)				210.5	
4170 2080					
3 26 51 8	9 14	0 215	5 368	431	500

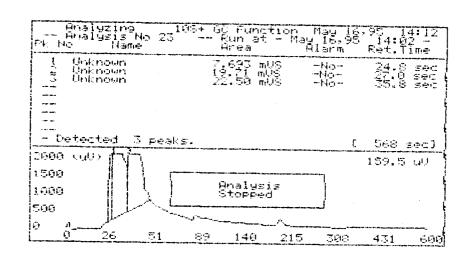
584-1-9 100-2 11.19

G.C. Ready 1884 Analysis No 21 % No Name	- GC Fu Kun Area	nction at - Mag	May 16 16,95 11acm	.95 1 13:3 Ret.T	s:47 ime
1 Unknown 2 Unknown	37.35 25.89	mUS mUS	-Mo-	34.4 37.1	Sec Sec
- Detected 2 peaks.			£	590 s	sec]
ຍ (ຫປ) <mark>,</mark>				205.0	QU.
5 2					
					_
0 26 51 8	9 14	9 215	্যারভ	431	1:1

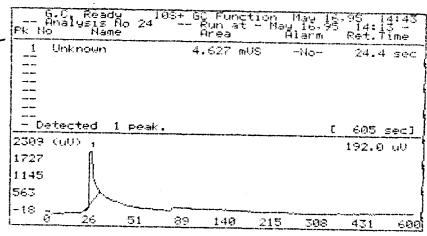
584-6-5.5 100~l 12.19



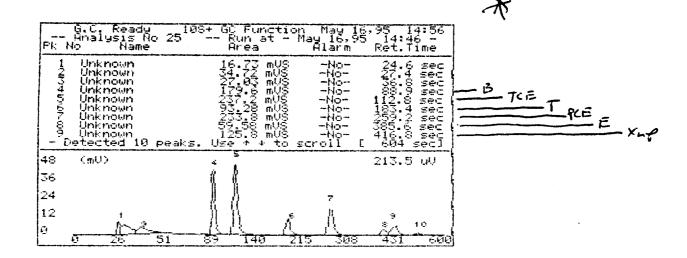
534-6-7.5 200.2 15.54



Syringe blank C



50 mg/L 100 pl



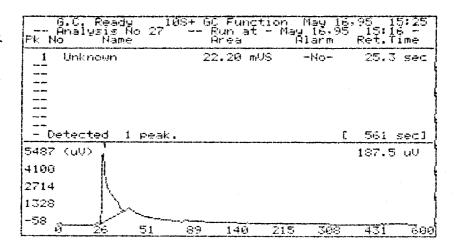
G.C. Readu 109 Analysis No 25 °k No Name	S+ GC Function Run at - I Area	n May 16 May 16,95 Alarm	.95 14:56 14:46 - Ret.Time	
2 Unknown 3 Unknown 5 Unknown 5 Unknown 6 Unknown 7 Unknown	34.72 mUS 27.83 mUS 179.6 mUS	-Mo- -Mo- -Mo-	27.4 sec 36.8 sec 88.9 sec 112.8 sec	
	237.2 mUS 95.28 mUS 233.8 mUS 59.58 mUS 125.8 mUS	-No- -No- -No- -No-	112.8 sec 183.4 sec 259.2 sec 385.6 sec	
8 Unknown 9 Unknown 18 Unknown - Detected 10 peaks.	Z0.62 mys	-Mō- -No- scroll (416.8 sec 492.0 sec 604 sec]	,

Æ~~#B b<R

30.3/2 st

- G.C. Readu 189 - Analysis No 26 Pk No Name	S+ GC Function Run at - Ma Area	May 16 16,95 Alarm	.95 15:18 14:55 - Ret. Time
2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 10 Unknown 10 Unknown 10 Unknown	48.23 mUS 54.4.3 mUS 54.4.3 mUS 57.4.9 mUS 1236.15 mUS 66.15 mUS 142.3 mUS 26.90 mUS 26.90 mUS 26.90 mUS	-No- -No- -No- -No- -No- -No- -No- -No-	00000000000000000000000000000000000000
55 (mU) 41 27 13 1 3 6 25 51	1 5 140 215		188.5 uU

Mw 07-95-2*



-MW 07-95-2 100 - R

6

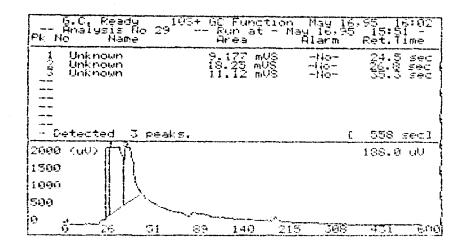
6.C. Ready -- Analysis No 28 Pk No Name GC Function May 16, - Run at - May 16,95 Area Aisrm 95 15:46 15:27 Ret.Time 1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 9 Unknown 9 Detected 24 peaks. 54.5 sec 56.7 sec 56.7 sec 66.7 sec 66.7 sec 105.6 sec 174.5 sec 194.0 uU 174 (mU) 130 87 43 la. 40 604.4 mUS 268.2 sec | | 18 Unknown -- No-! - Detected 24 peaks. Use + + to scroll 605 sec] | E 1 23 4 58 5 3 1012 1418 17 19202122 24 12000 17707 17475 707 | į 11599

G.C. Analy Fr No	Ready ISIS No Name	28		ction t - May	May 16 1 16.95 Alarm	7.95 15 15:27 Ret. T	(:48 me
19 Unkr 11 Unkr 12 Unkr 10 Unkr 10 Unkr 15 Unkr	(2011 1001 1001 1001 1001 1001 1001		168.7 758.5 168.3 17.8 17.8	USAC MUS MUS MUS MUS MUS MUS USAC	-Mo- -Mo- -Mo- -Mo- -Mo- -Mo- -Mo-	145.484848 4567.9968 17.8848	Sec Sec Sec Sec Sec Sec Sec
17 Unit 18 Unkr - Detect	nown ted 24 :	oeaks.	604.4 Use † 4	mUS mUS - to sci 	-No- -No- roll (258.2 505.2 202122	sec (seci seci

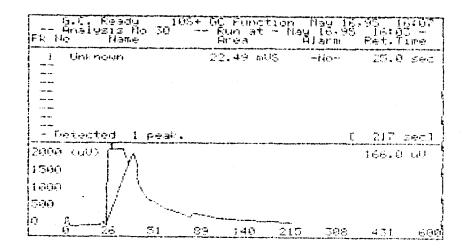
	G.C. Ready - Analysis Mo Pt No Name	105+ GC Function 28 —- Run at - M Area		95 15:49 15:27 Ret.Time
-	16 Unknown 17 Unknown 18 Unknown	1.014 VSec 479.3 mus 604.4 mus	-No- -No- -No-	218.6 sec 251.7 sec 250.2 sec
,	16 Unknown 17 Unknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 22 Unknown 23 Unknown 24 Unknown	1,238 USAC 335.4 mUS 188.1 mUS 214.9 mUS	-No- -No- -No-	347.3 sec 380.3 sec 427.5 sec 464.4 sec
		147.5 mUS 110.1 mVS	-Mo- -Mo- croll [487.2 sec 525.0 sec 605 sec] :02122 24

Y'3 ---

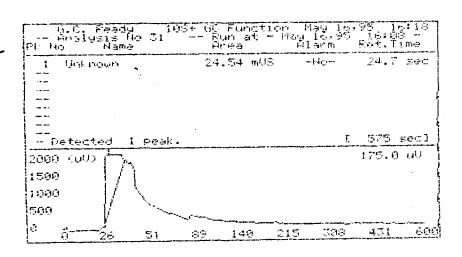
684-5-1.5 100.29



Syringe Slank 750pl



5B4-6; 1.5 100 pl



984-5-3.5 ionl 11.29 & ...

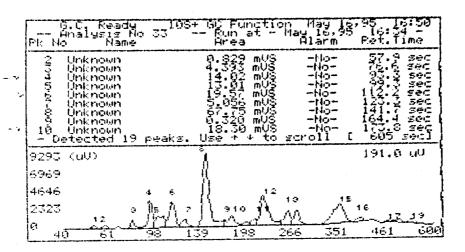
G.C. Ready 10 Analysis No 32 Pk No Name	S+ GC Function Run at - Ma Area	May 16.95 16:31 16.95 16:20 Alarm Ret.Time
1 Unknown 2 Unknown 3 Unknown	1.894 mUS 1.114 mUS 0.660 mUS	-No- 25.4 sec -No- 27.9 sec -No- 55.1 sec
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown	1.14 mUS 0.560 mUS 0.7600 mUS 0.7600 mUS 0.800 mUS	-No- 50.4 sec -No- 78.6 sec -No- 89.8 sec
7 Unknown 8 Unknown 9 Unknown - Detected 19 peaks	4.751 mV9 3.463 mV9 4.972 mV9 . Use ↑ ↓ to sc	-No- 95.2 sec -No- 101.4 sec -No- 114.2 sec roll (594 sec]
2190 (UU)	10	205.0 40
2379 1568	7 9 1	
757 12	الايدا المأثر	75 77 18 18 18 M
-54 <u>g 26 51</u>	89 140 215	308 431 699

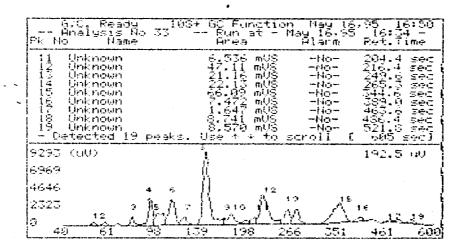
901-3-55 Foot

9.0. Ready 108 Analysis No 32 Pk No Name	+ GC Function Run at - M: Brea	May 16,95 16:32 ay 16,95 16:20 - Alarm Ret.Time
19 Unknown 11 Unknown 12 Soknown 13 Onknown 14 Onknown 15 Onknown 16 Unknown 17 Unknown 18 Unknown - Detected 19 peaks.	22.24 mUss muss muss muss muss muss muss muss	-No- 144.2 sec -No- 167.4 sec -No- 176.4 sec -No- 176.4 sec -No- 2767.7 sec -No- 2767.7 sec -No- 348.3 sec -No- 3594 sec
2000 (uV)	- I	184.0 uU
1500	, 2 ()	(a)
1000 12	5 /3 / //	17
500 A 1		
0 0 26 51	89 140 21	5 J08 431 600

12	257 mUS 497 mUS 560 mUS .83 mUS	-No- 1	67.4 sec 76.4 sec 96.4 sec 19.4 sec
	996 mUS 426 mUS .86 mUS 443 mUS 099 mUS	-No- 2	15.45 secu 647.49 secu 647.49 secu 145.42 secu 145.42 secu

984-5-55 10rl 8.69



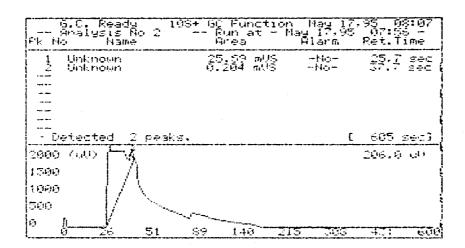


<u> </u>	ָבָּרְ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרָ בְּעָרְ בְּעָרְ	Ę		Ų		-d'm	S.VVI ENE	Total
		<u>.</u>	ון מיטיטיי	<u> </u>		<u> </u>		; ;
SB4-5-5.5	9.06	68.7	228.1	110.1		0.0	0.0	643.5
SB4-5-3.5	4.0	18.7	47.6	22.9		0.0		129.8
SB4-6-10	4.6	38.7	323.5	301.0	434.3	604.9	0.0	1707.0
MW08-95-2	0.0	1.		0.0		0.0		1.1
MW06-95-2	15.1	6.4		5.0		0.0		43.6
MW06-95-2*	14.7	7.3		4.2		0.0		42.7
MW07-95-2	89.2	124.2		0.0	281.5	0.0		991.1

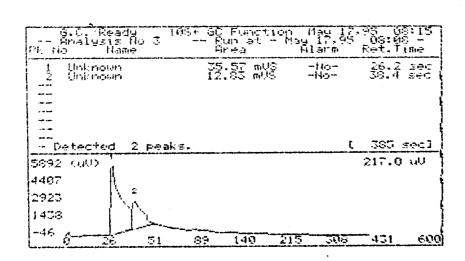
Machine Blank

Pk No Na			 	 	
- Detected	0 peak	Ξ.	 	 605 s	ecl
·				222.0	цU
2000 (uV)					
2000 (uV) 1500					

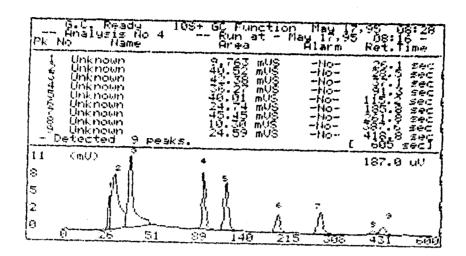
Syringe Blank A



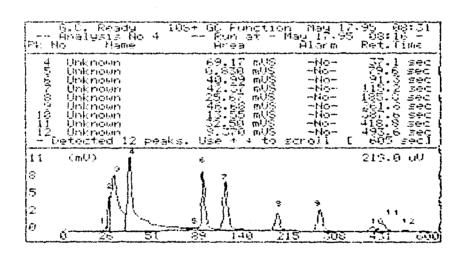
Syringe Blank B



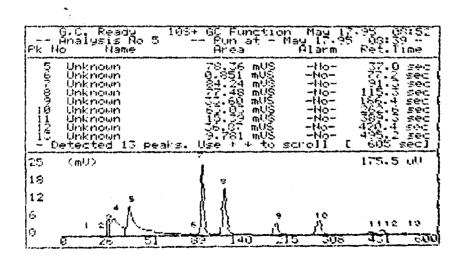
10 mg/L Std 250 ml



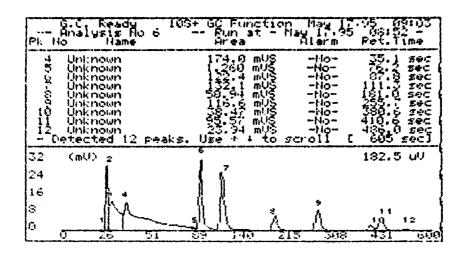
50 mg/L



50 ug/L 700 ul



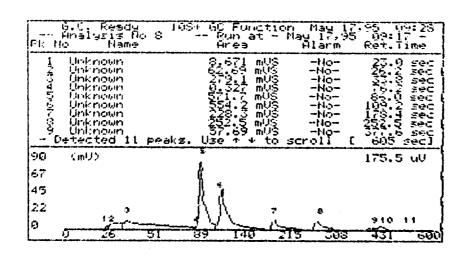
50 mg/l



500 ug/9 25 ml

6.0. Ready 10 Analysis No 7 Pk No Name	5+ GC Function Run at - I Area	n May () Yay (),95 Alarm	95 09:16 99:46 - Pet.Time
4 Unk nown 5 Unk nown 6 Unk nown 7 Unk nown 9 Unk nown 10 Unk nown 11 Unk nown 12 Unk nown	0.500 mU00 0.500 mU00 0.500 mU00 0.500 mU00 0.500 mU00 0.445 0.445	-No- -No- -No- -No- -No- -No-	41.8 sec 17.38 sec 17.38 sec 18.54 sec 18.54 sec 18.56 sec
12 (Inknown - Detected 12 peaks 48 (mU)	7.714 mils	-rio- foroli (412.0 sec 488.0 sec 605 sec]
36 24			· · · · · · · · · · · · · · · · · · ·
12 0 1 3 4 0 25 51	<u> </u>	<u> Å</u> 508	10 12 451 600

500 ug/l 25 ul



sough as w

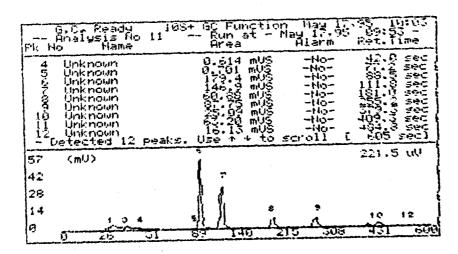
PŘ N	G.C. Res Analysis O H		St 60 Funct Run at Pirea	ion May i - May i7.9 Alarm	99:39 5 69:36 - Ret.Time
Seamont Cho	Unknowr Unknowr Unknowr Unknowr Unknowr Unknowr Unknowr Unknowr Unknowr Etected		44600000000000000000000000000000000000		45.2 sec 45.2 sec 45.3 sec 55.3 sec 140.2 sec 140.2 sec 155.3 sec 155.3 sec 155.3 sec 155.3 sec
39 39	CmO				218.5 W
29 19					
9 ~		و انځي په	56	9 10	
0	ā 26	— <u>————————————————————————————————————</u>	89 140	215 508	431 80

6~11E b"R

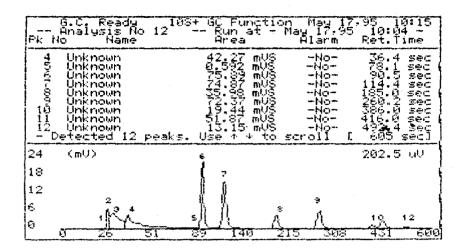
5:0 ug/è 25.ul

PK 1	6.0 Res Analysis O As		~~ R	Funct un at	- Hay	17.95 arm	95 09 09:40 Ret.T	152 me
40-9-0000-64	Unknow Unknow Unknow Unknow Unknow Unknow Unknow Unknow Unknow	ስ ባ ስ ስ ስ ስ	1.04 1.04 1.05 1.05 1.04 1.04 1.04 1.04 1.04 1.04 1.04 1.04	3.3 mU0 3.4 mU0 25 mU0 25 mU0 34 mU0 774 mU	1 1 1 1 1 1 1	Ho- No- No- No- Ho- Ho- No- No- I	47.50 0 4 5 0 6 5 0 6 5 0 6 6 5 0 6 6 6 6 6 6 6 6	56000000000000000000000000000000000000
56 42	(mU)			Ž.			187.5	spet
28 14 0	1 5 25	2 0 4 2 0 31	<u> </u>	115	1 1 215	<u>0</u> 0	4.51	12

500 ug/l 25 ul



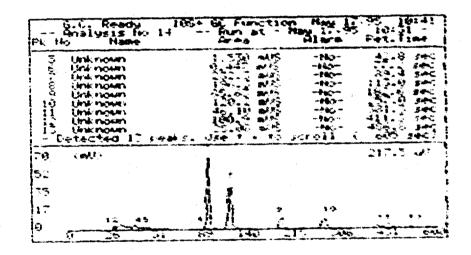
50 ug/l



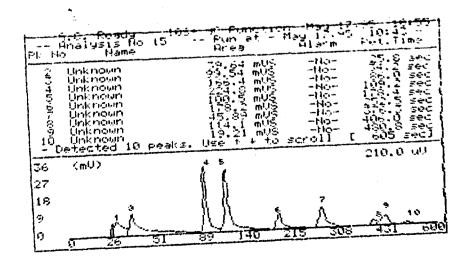
Method Blank

G.C. Ready 195 Analysis No 13 Pk No Name	+ GC Function Run at - Ma Area		95 0:38 0: 6 - et.Time
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown	0.166 mUS 9.508 mUS 27.46 mUS 53.36 mUS 0.118 mUS	-110- -110- -110- -110-	20.7 sec 27.8 sec 27.1 sec 27.1 sec 76.8 sec
6 Unknown 7 Unknown - Detected 7 peaks.	0.892 mUS 0.959 mUS	-No- -No-	190.0 fec
7987 (UU) 5972 23	Select Tupe		220.0 (8)
1	· 1		
3957 1942 -73	Sample		

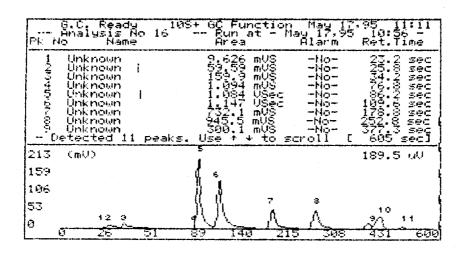
50 ug/l 25 ul



50 ug/l

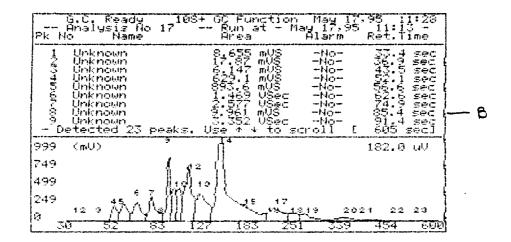


500 ug/l 50 ul



Pk H	G.C. Ready	188+ GC Function	May 17,95 11:12
	Analysis No	is Run at - Ma	ay 17,95 10:56 -
	o Name	Area	Alarm Ret.Time
0.000	Unknown	159.9 mUS	-No- 34.2 sec
	Unknown	1.094 mUS	-No- 76.8 sec
	Unknown	1.084 USec	-No- 86.2 sec
	Unknown	1.147 USec	-No- 109.6 sec
040000000000000000000000000000000000000	Unknown	732.1 mVs	-No- 178.8 sec
	Unknown	945.5 mVs	-No- 252.8 sec
	Unknown	300.1 mVs	-No- 377.3 sec
	Unknown	869.1 mVs	-No- 497.0 sec
	Unknown etected 11 (mU)	173.0 mUS peaks. Use ↑ + to sc	-No- 482.0 sec croll [605 sec] 197.0 uV

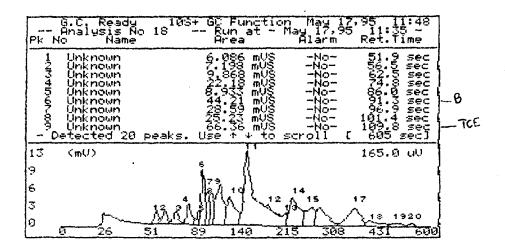
584-5-7.5 25 W



G.C. Ready Analysis No 17 Pk No Name	188+ GC Functio Run at - Area	n May 17 May 17.95 Alarm	.95 11:30 11:15 - Ret.Time	
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 15 Unknown 16 Unknown 17 Unknown 17 Unknown 18 Unknown 18 Unknown	2.025 USec 2.110 USec 2.117 USec 4.276 USec 2.776 USec 176.75 USec 4.1504 USec 1.6 4 V to	- X-0- - X-0- - X-0- - X-0- - X-0- - X-0- - X-0-	961.000 seecuc 1120.000 seecuc 1120.000 seecuc 120.000 seecuc 120.000 seecuc 120.000 seecuc 120.000 seecuc 120.000 seecuc 120.000 seecuc	—TCE

G.C. Ready 10	S+ GC Function	May 17	.95 11:31
Analysis No 17	Run at - M	ay 17,95	11:13 -
Pk No Name	Area	A)arm	Ret.Time
15 Unknown	176.9 mUS	-Ho-	169.4 sec
16 Unknown	46.79 mUS	-Ho-	200.0 sec
17 Unknown	4.155 USec	-Ho-	212.4 sec
18 Unknown	1.904 USec	-Ho-	243.4 sec
16 Unknown 17 Enknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 22 Unknown 23 Unknown	2,501 USAC 2,079 USAC 952.0 mUS 313.1 mUS	-No- -No- -No- -No-	251 0 500 (338 3 500 (381 0 500 (455 2 500 (
23 Unknown - Detected 23 peaks	162.8 mUS	croll [512.9 sec 605 sec]

384-5-9.0 25 W



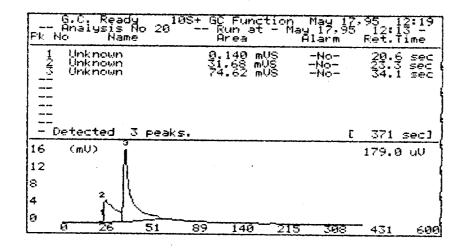
10 Unknown 52.85 mUS -No- 120.6 sec 11 Unknown 282.7 mUS -No- 133.4 sec 12 Unknown 5.594 mUS -No- 170.0 sec 13 Unknown 1.234 mUS -No- 201.2 sec 14 Unknown 101.2 mUS -No- 213.0 sec 15 Unknown 62.94 mUS -No- 245.0 sec 16 Unknown 62.94 mUS -No- 245.0 sec 17 Unknown 122.8 mUS -No- 340.0 sec 17 Unknown 122.8 mUS -No- 340.0 sec 18 Unknown 42.26 mUS -No- 333.0 sec 19 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 333.0 sec 10 Unknown 105.26 mUS -No- 340.0 sec 10 Unknown 105.27 mUS -No- 340.0 sec 10 Unknown 105.27 mUS -No- 340.0 sec 10 Unknown 105.28 mU	G.C. Ready Analysis No Pk No Name	105+ GC Function 18 Run at - M Area	1au 17,95	95 11:49 11:35 - Ret.Time
	11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unknown 17 Unknown 18 Unknown	28-7- mVS 2-7- mVS 3-24- mVS 1-01-24- mVS 608-7-1- mVS 808-7-1- mVS 142-26- mVS		170.0 sec 201.2 sec 213.0 sec 245.0 sec 246.0 sec 2440.0 sec

G.C. Ready Analysis No 1 Pk No Name	108+ GC Functio 18 Run at - Area	n May 17 May 17,95 Alarm	.95 11:49 11:35 - Ret.Time
12 Unknown 13 Unknown 14 Unknown 15 Unknown	3.594 mUS 1.234 mUS 101.2 mUS 62.94 mUS	-No- -No- -No-	170.0 sec 201.2 sec 213.0 sec 245.0 sec
12 Unk nown 13 Unk nown 14 Unk nown 15 Unk nown 16 Unk nown 17 Unk nown 18 Unk nown 18 Unk nown 19 Unk nown 20 Unk nown	\$8.71 mUS 122.8 mUS 42.26 mUS 24.01 mUS	-No- -No- -No-	261.8 sec (340.0 sec 383.0 sec (458.0 sec (
	11.59 mys	scroll [516.2 sec 605 sec]

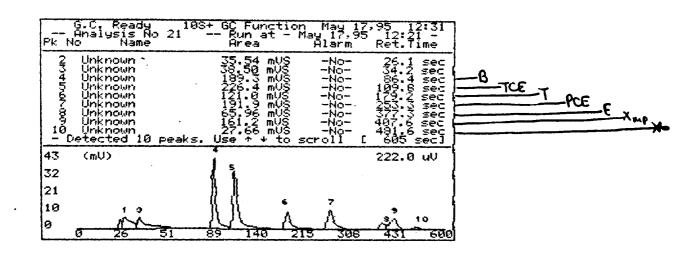
G.C. Ready 10S+ GC Function May 17,95 12:08 -- Analysis No 19 -- Run at - May 17,95 11:57 -Pk No Name Area Alarm Ret.Time 0.098 mUS 19.08 mUS 0.207 mUS 20.4 sec 23.5 sec 34.4 sec Unknown Unknown Unknown 605 sec] - Detected 3 peaks. 187.5 uV 4207 (uU) 3155 2103 1051 Ø 308 431 215 51 89 140 Ô

684-4-1.5 100 ul

> 34-4-3.5 100 ul



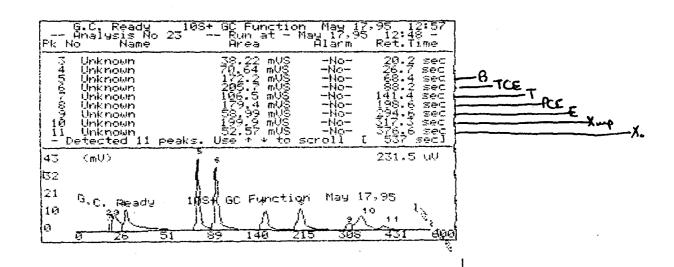
50 mg/l 100 ml



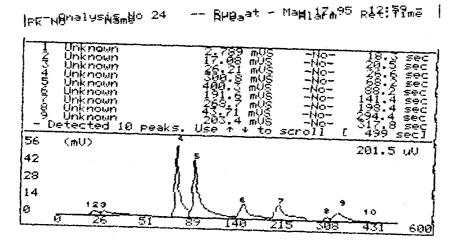
500 ey/l 20 ul

Pk No	Readu lysis N Name	0 22 ·	- GC Fur Run a Area	retion it - Ma	Mag i ny 17,9: Alarm	7,95 5 12:3 Ret.7	2:43 ime
ANTENDERO.	known known known known known known known known known cted 10	peaks.	173.8 212.2	######################################	11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	7500-14007-6 7507-6-0-7-7-7-7-0-6 117-7-7-0-6 117-7-7-4	50C
58 (m	(V)		4			253.5	uU
43		i	5				
29			i k				
14		{	{	_	_		
Ø	12 3	/	V	Å	Ž.	89	10
<u> </u>	26	51 8	9 140				

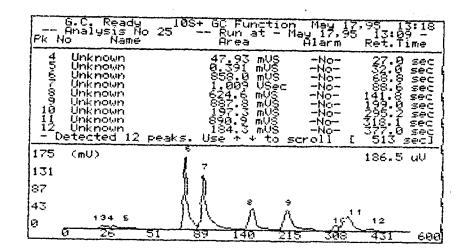
50 ug/l



500 ug/l 20 ul



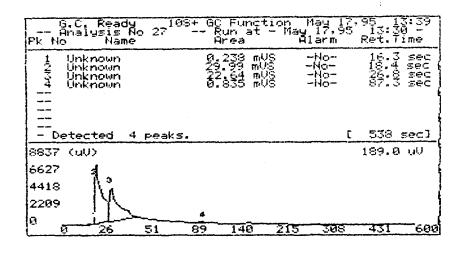
500 ng |l 50 nl



584-4-5.5 100 wl

G.C. Ready 1 Analysis No 26 Pk No Name		Funct fun at Area	ion M - May Al-	ay 17 17,95 arm	.95 1 13:2 Ret.T	3:29 ime
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown	9 24 9 9	268 mU 4.20 mU 37.2 mU 77.2 mU 734 mU	00000 1 † 1	70- 700- 700- 700- 700-	15.8 18.1 22.4 88.1 141.8	500 500 500 500 500
Detected 5 peak	5.	···			388 : 201.5	sec] uU
30 29 10 ₂						į
0 0 28 51	89	5 149	215	<u> রগ্রহ</u>	431	600

584-4-7.5 100 ul



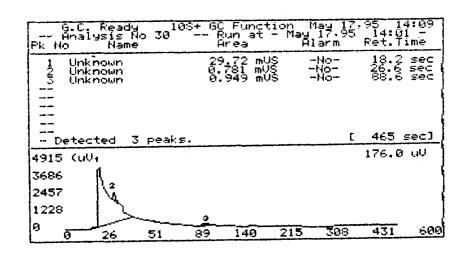
584-4-8.5 100 W

Pk N	3.C. Rea Analysis Na	du No : me	28 ^{105±} -	GÇ Fun - Run Area	nction at -	May 17.9 May 17.9 Alarm	7, 55	95 1. 13:4 Ret.T	3:49 1 - ime
GROND	Unknown Unknown Unknown Unknown Unknown			9.152 36.44 9.709 9.948 9.767	1 JC			16.1 18.2 28.0 140.9	Sec Sec Sec Sec
	etected	5 pe	eaks.				ξ		secl
<u>- De</u> 5609 4206 2804	etected (uV ₂	<u>5 pe</u>	eaks.					489 : 179.5	

50-4-3-1.5 100 ul

G.C. Ready 108 Analysis No 29 Pk No Name	+ GC Function Run at - M: Area	May 17, ay 17,95 Alarm	95 14:00 13:51 - Ret.Time
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown 6 Unknown	0.223 mUS 25.86 mUS 63.18 mUS 0.838 mUS	-No- -No- -No-	16.1 sec 18.2 sec 26.7 sec 87.8 sec
5 Unknown 6 Unknown	63.18 müs 0.838 mus 9.871 mus 2.748 mus	-No-	26.7 sec 87.8 sec 142.0 sec 318.4 sec
- Detected 6 peaks.			525 sec]
16 (mV)			201.5 UV
12			!
s <u> </u>			
14	_		,
0 0 26 51	4 <u>5</u> 89 140 21	৬ ড ডিচ্ছ	431 600

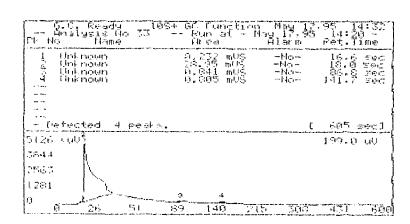
584-3-3.5 100 ul



584-3-5.5 100 ul

9 H OM 49	.C. Ready Inalysis No Hame	32 G	î Funct Run at Area	ion May 1 - May 17,9 Alarm	7,95 14:15 5 14:11 - Ret.Time
3	Unk nown Unk nown Unk nown Unk nown	9 2 1 0	.200 ml 1.68 mV 11.4 ml .774 ml	18 -No- 15 -Ho- 16 -Ho- 15 -Ho-	14.2 sec 17.9 sec 26.3 sec 87.0 sec
~~~	tected 4 :	peaks.		N 900	[ 461 sec] 214.0 uU
23 15 7					
e គ	<u> </u>	4 51 - 89	146	215 368	431 60

584-2-2.0 100 ul



58**4**-2-3.5

h.C. Feadu 1084 Analysis No 34 Pk No Name	FĞC Fu Gun Area	at - May	Mog 17. / 17:55 (Larm	95 14 14:35 Ret.11	
1 Unk nown 2 Unk nown 3 Unk nown 4 Unk nown	6.257 22.657 0.624	mUS mUS mUS mUS	-No- -No- -No-	1909 1909 1909 1909 1909 1909 1909 1909	500 500 500 500
- Detected 4 peaks.			<u>r.</u>	438 s	
5664 (uU₂ 4248 - ∭				194.5	ųÜ
2852	4				
θ <del>β 26.</del> 51	89 14	a 215	305	431	62

584-2-5.5

Pl: do Hame  1 Uni noun 2 Uni noun 5 Uni noun 4 University	Ares 8,270 mUs 27,02 mUs 30,85 mUs 5,856 mUs	(140) (140)	Ret.Time 16.0 sec 18.1 sec 25.5 sec 87.2 sec
		С	495 sec]
7744 0 000 57607			189.0 uV
1835	4		

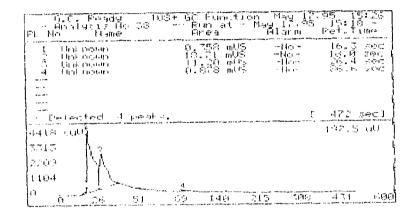
5B4-2-7.5

5.C Ready in - Analysis No Sa Ft No Hame	34 GC Function Pun at - Orea	Mag 17 95	.95 <u>15:01</u> 14:55 — Fet.Time
1 Plak noun 5 Unit noun 1 Plat noun 4 Plat noun 5 Unknoun 6 Unknoun	8.193 mHS 7.145 mUS 19.39 mUS 19.380 mKUS 0.358 mKUS 0.720 mUS	Plane Plane Plane Plane Plane Plane	16.2 sec (8.3 sec (8.3 sec 26.9 sec 27.6 sec (42.5 sec
- Detected 6 peaks		Γ	488 360.1
5560 (1015.54 4170	***************************************	i denggan bayak i Fi Mi ya a diwama wake bay Mai Amerika	195.0 aU
1780 M	5 ÷		
# A 26 51	89 140	395 <b>50</b> 8	431 600

384-7-15 100 ul

G.C. Ready 105 Analysis No 37 Pk No Name	+ GC Funct Run at Area	ion May 17 - May 17,95 Alarm	.95 15:16 15:08 - Ret.Time
1 Unknown 2 Unknown 3 Unknown 4 Unknown 5 Unknown	8.331 mU 8.377 mU 18.02 mU 33.61 mU 53.847 mU	S	16.1 sec 18.0 sec 19.6 sec 26.4 sec 87.2 sec
- Detected 5 peaks.			470 sec]
8662 (UV) 6496 4331 2165	£.		254 / Ø TuV
(C)		215 308	431 600

384-7-35 100 W



584-7-5.5 100 M

lat. Peady 117. Hanalysis Mo 3ª Di No Name	f GC Functio Run st - Area	m May 17 May 17.95 Alarm	95 (5:5 15:28 - Pel.lima	
( Unitrown ) Unitrown : Unitrown d Unitrown 5 Unitrown	0.791 mUS 0.502 mUS 17.85 mUS 07.86 mUS 0.601 mUS	~ (44, 1~ ~ (40~ ~ (40~ ~ (40. ~ (40.~ ~ (40.~	16.  56  8.0 56  19.6 56  26.0 56  86.8 56	어디 ( 연변 연변
- Defected 5 peaks.		<u> </u>	530 400	
20 Cm(1)			194.5 ul	, I
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o 126 51	हव 140	सुरु उत्तर	_asi	600

G.C. Ready 188+ GC Function May 17.95 15048
-- Analysis No 40 -- Run at - May 17.95 15041 -PR NO Rame -- Run at - May 17.95 15041 -PR NO Rame -- Run at - May 17.95 15041 -PR NO Rame -- Run at - May 17.95 15041 -PR NO Rame -- Run at - May 17.95 15048
-- How Ready -- Run at - May 17.95 15048
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-- 1 Linkmoun -- 1.18 m/S -- Ho- 26.9 sec
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564-7-7.5 100 ml

584-6-11.5 100 ml

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Lift Ready (N) - Unalysis No 4; El No Hame	F AT Function Run at P Area	1 Muy (7.95 (6 1ay 17.95 (6:00 Alarm Rel.Ti	:09 me
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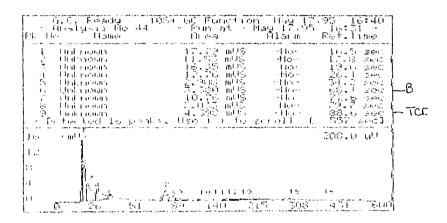
6.C. Readu 108+ bl Function May 17.95 16:29
Analysis Mo 43 — Run at - May 17.95 16:23 —
Ph Mo Name Area Alarm Ret.Time

1 Unknown 9.341 mUS - Mo 16.1 sec
2 Unknown 72.06 mUS - Mo 26.8 sec
3 Unknown 0.746 mUS - Mo 26.8 sec
4 Unknown 0.779 mUS - Mo 36.5 sec

- Petected 4 peaks. [ 347 sec]
8712 cuU
6534
4356
1178
6 0 26 51 89 148 215 388 431 600

syringe Blank 250 A

MW17-95-2



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| 7W18-95-2*

u.C. Ready 1895 — Analysis No 45 Pk No - Name	F GC Function - Run at - M Area	May 17. ay 17.95 Alarm	.95 16:53 16:43 Ret.Time
1 Del meston 2 Unit region 3 Unit region 4 Unit region 5 Unit region 6 Unit region	0.164 mUS 6.095 mUS 20.33 mUS 1.23.0 mUS 1.23.0 mUS 1.932 mUS	No No No No No	15.9 sec 18.9 sec 19.7 sec 20.2 sec 176.4 sec 178.8 sec
- Detocted d peaks.			506 sec] 195.5 uU
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70  20  10			

100 ml

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HW10-95-2 100 ul

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HW10-95-2*

G.C. Ready 188 Analysis No 48 Pl No Name		at - Mag	May 17. y 17.95 11arm	17:17	
Unknown   Unknown   Unknown 	0.364 4.256 1.25 0.71 0.71	eUs EUm EUs MUS MUS	- No- - No- - No- - No- - No-	16.5 18.0 19.8 36.3 80.1	590 590 590
· Detected 5 peuls.		***************************************	]	538 3	
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ing the French Ling. Here for the grid Ling. Fig. 116 — It most	<ul> <li>Bound at the</li> </ul>	na Hay 1700 Hay 1709 Ellard R	473-300 [
1 Lind meson 2 Opt passing 3 High reson 4 High reson	U. [See m195 4. [44] m195 1 4. d. m195 235 02 期以	- No - -No- -No- -No-	15.0 sec 15.0 sec 35.3 sec
St. Optimition   C. Optimition   C. Optimition   C. Optimition   C. Optimition   St. Optimition   St. Optimition   St. Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   Optimition   O	140. 5 m/cb 1652. 1 m/cb 96. 40 m/cb 147. 1 m/cb 56. 47 m/cb	* Ho = * Ho = 1 * Hor = 1	68.1 200   68.4 300   42.4 200   99.8 200   96.5 200
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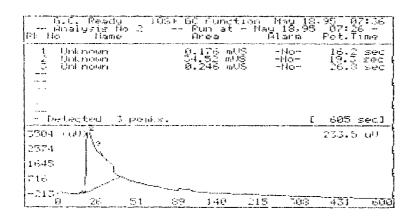
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SAMPLE ID		<u>y</u>	IOCUENE	7	EIHTERNZENE	אוריוי	מאורבווער מייני	פוס
34-5-7.5	19.0	8.9	0.0	0.0	0.0	0.0	0.0	27.8
34-5-9	22.5	139.6	0.0	0.0	0.0	0.0	0.0	162.0

						-d'm		
SAMPLEID	BENZENE	5	TOLUENE	껉	ETHMLBENZENE	XMENE	<b>OXYLENE</b>	Total
MW17-95-2	1.8	1.9	0.0	0.0	0.0	0.0	91.1	94.9

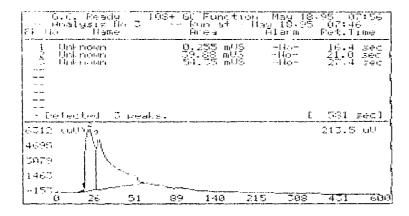
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Fk No	.C. Peac nalysis Nam	No 1	F	Fur ku. ke/	ction t - M	May ( ay 18,5 Alarn	8,95 0 5 07:0 Ret.T	7:23 ime
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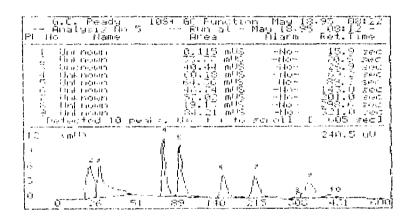
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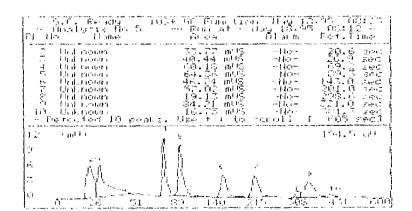


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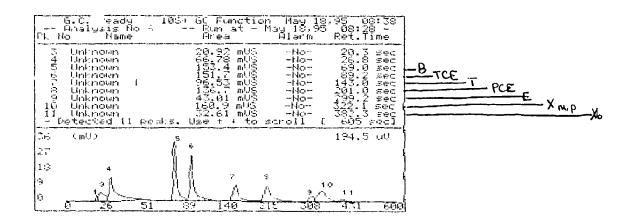
G.C. Ready 188 Aralysis No.4 Pk Ho - Name	r 50 Funct: Rum st - Area		95. 08: 08:00 Ret.Tin	- i
1 Unk nown 2 Unk nown 3 Unk nown 4 Unk nown	6.097 mUS 43.24 mUS 48.87 mUS 1.175 mUS	-No- -No-	_ 20, 2 s _ 26, 1 s	ec ec ec
- Detected 4 peaks.		[	605 se	}c]
1				
5687 tuUq ^{**}  6481          4275			187.5 (	أ ارا <u>د</u> أ

10 mg/l 250 ul

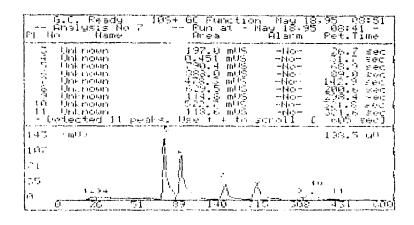




50 mg/l

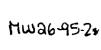


500 mg/f



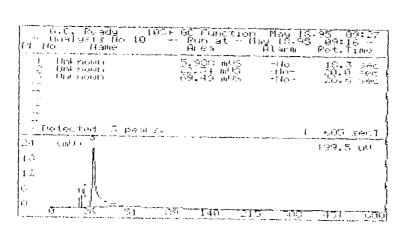
NW26-95-2 100 Ml

G.C. Ready 10% → Analysis Ho 8  PL Ho Hame	r GC Function · Run St − N Ares	n May 18 May 18.95 Alarm	95 09:03 00:53 - Ret.Time
1 Unkinown 2 Unkinown 3 Unkinown 4 Unkinown 5 Unkinown	0.107 mUS 5.153 mUS 19.88 mUS 50.12 mUS 0.665 mUS	-140 -(40 -440- -440- -440-	16.3 sec 18.4 sec 20.1 sec 26.7 sec 87.7 sec
- Detected 5 peaks.		ξ	605 secl
11			
0 0 25 51	<u>e</u> 39 140 7	នៃ ខាន	431 633

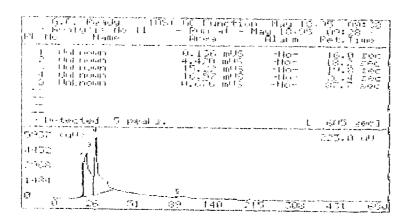


G.C. Ready 103 — Analysis No 9 Ph No Hame	+ AC Function Run at - I Area	n May 18. May 18.95 Alarm	95 09:15 09:04 - Ret.Time
1 Unk nown 2 Unk nown 3 Unk nown 4 Unk nown 5 Unk nown 6 Unk nown	6.055 mUS 22.34 mUS 33.05 mUS 1.805 mUS 1.890 mUS	-Ho- -Ho- -Ho- -Ho- -No- -Ho-	
- Detected 6 peaks.		Ĭ.	605 sec) 221.0 uV
0 9 26 31	مناسبين والمواد سناموا يتم	s 6 15 308	431 ह्य

MW26 A5-2*



HW15-19-2



MW23-95-2

G.C. Ready 195 Analysis No 12 Pt No Name	+ GC Function Run at - M Area	May 18: ay 18:95 Alarm	.95 @9: 09:41 Ret.Tim	
1 Unk nown 2 Unk nown 3 Unk nown 4 Unk nown 5 Unk nown	0.109 mUS 4.729 mUS 1801 mUS 36.48 mUS 0.226 mUS	Mo Mo Mo Mo Mo	- 10 · ( 9	rec rec rec rec
- Petected 5 pwaks.		Ĺ	605 se	ecil
10 (mU)			200.5	4U
5 3				
· · · · · · · · · · · · · · · · · · ·				
13 11/2				

MW25-95-2

6.0. Feedy	105+ GC Function	lau 18,95 -	95 10:04
Theatwars Mo II	: - Gun at - b		09:53 -
M. Ho Hame	Area		Cet.Time
1 Unit from 1 Unit from 2 Unit from 3 Unit from 4 Unit from 5 Unit from 6 Unit from 7 Unit from 6 Unit from 6 Unit from 7 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit from 6 Unit	17.70 m/08	Ho-	16.7 sec
	17.18 m/08	Ho-	18.0 sec
	97.84 m/08	Ho-	21.4 sec
	217.4 m/08	Ho-	26.6 sec
	147.8 m/08	Ho-	27.4 sec
	52.48 m/08	Ho-	40.6 sec
130 11 1 12 200 1	178.영 mUS 121.3 mUS	-Mó- -Mo- -Croll [	44.0 200 49.1 200 600 8001
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	তিন্তু (ৰিজ্	51 . 108	विजि स्टिस

Fil. Ready 1978	i bi Function	์ ที่รู้นั้น เชื่	.95 [H:05]	
Analysis for 17	- Bun At - M	อน (ค. 95	H9:53 -	
Pt (6) Hisme	Area	ผันอกต	Rollime	
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unknown 16 Unknown 17 Unknown 17 Unknown 18 Unknown 18 Unknown 18 Unknown	360.5 mU5 3.032 U5ec 3.032 U5ec 3.032 U5ec 1.159 U5ec 1.159 mU6 2.150 mU6 1.150 mU6 1.44.0 mU6 1.44.0 mU6 1.44.0 mU6	cho- cho- cho- cho- cho- cho- cho- cho-	50.0 sec 53.0 sec 53.0 sec 11.0 sec 11.0 sec 150 s sec 150 s sec 150 s sec 150 s sec 150 s sec	B TCE

G.C. Peady (1	Ps+ GC Fonction	May 15	.95 (ฏ:05	
Amalysis No 13	- Pun at · b	lay 18.95	ฏ9:55	
PL No Hame	Area	Atarm	Ret.lime	
16 Unknown 17 Unknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 22 Unknown 23 Unknown 24 Unknown 24 Unknown 25 Unknown 26 Unknown	22 mUS 591.1 mUS 194. mUS 183. mUS 183. mUS 183. mUS 489. mUS 18.48 mUS 12.65 mUS	-14g j	150.2 sec 150.6 sec 150.4 sec 250.0 sec 250.0 sec 250.4 sec 250.4 sec 250.6 sec 250.6 sec 250.6 sec 250.6 sec	] ]

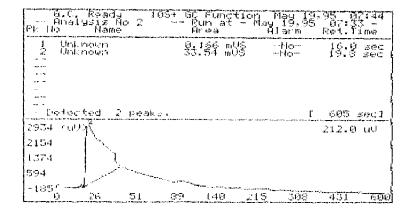
HW27-95-2

SAMPLEID	BENZENE	2	TOLUENE	<u> </u>	ETHMLBENZENE	m,p- XYLENE	o-XYLENE	Total
MW25-95-2	1249.0	257.9	0.0	0.0	67.1	152.1	0.0	1726.1

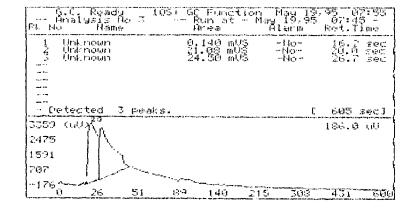
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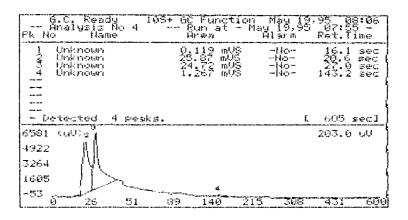
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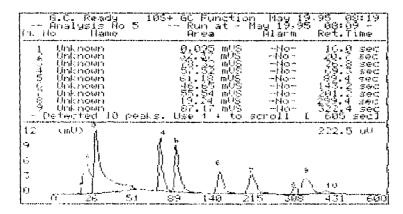
Syringe Blank B



Method Blank 350 A



10 mg/l Std aso.ul



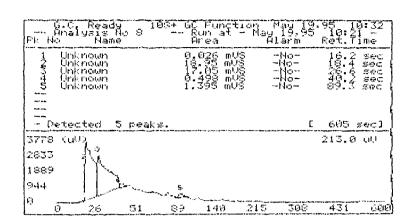
2 Unknown	G.C. Peady Analysis No S Pk No Hame	1854 GC Finctio - Run at - Prea		95 មុខ20 មិស្តសូម Ref.lime
l - Detected 10 peaks. Use t + to scrull [ 605 sec]	Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Driknown 9 Unknown 10 Unknown	100 000 000 000 000 000 000 000 000 000	Ho =	26.8 2800 26.3 2800 26.4 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2800 14.1 2

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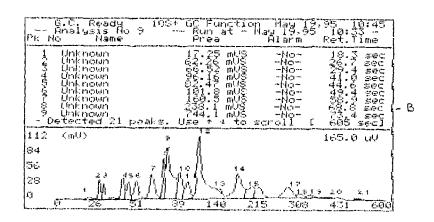
50 ug/l 100 ul

6.C. Readu - Analysis Mo 7 Th No Mame	(ÚS+ 60 Function - Run at - N Area	May 19.95 BE: Jay 19.95 BE:35 Alarm Ret.Tim
2 Unknown 5 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 10 Unknown 10 Unknown 10 Unknown	64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75 64.75	-No 00.0 s -No 25.6 ss -No 68.8 s -No 68.6 s -No 68.6 s -No 68.6 s -No 68.6 s -No 68.6 s -No 68.6 s -No 68.6 s
105 (mU) 93 62 31 (23		219.8 u

387-1-1.5 100 ul. 13.9g



587-1-3.5 100 wl 9.0 g

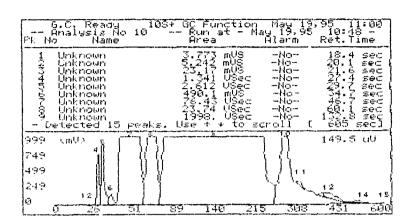


g.C. Peadu iii	5+ CC Function	ก ที่ลูน ไล้	.95 <u>10:46</u>	
Analysia Ao 9	- Pun at - 1	ไฮน โล้.จิร์	10:33 -	
Pk No - Name	Hrea	คีโฮเก	Ret.] umo	
10 Untimour	008.5 mUS	-Ho -	89.0 sec	TC1:
11 Untimour	198.9 mUS	-Ho -	97.4 sec	
12 Untimour	1.159 USec	-Ho -	17.6 sec	
13 Untimour	1.159 mUS	-No -	150.5 sec	
14 Unknown	237.9 mUS	-Ho -	169.0 sec	
11 Unknown 15 Unknown 16 Unknown 17 Unknown 18 Unknown 18 Unknown 19 Detected 21 peaks	709.6 mUS 700.1 mUS 705.7 mUS 727.0 mUS 727.0 mUS 72	-flor- -flor- -flor- -flor- scrott f	193.8 sec 206.4 sec 266.1 sec 208.2 sec 605 sec]	- E

G.C. Ready " Honalyzis No 9 Pl No Hame	185+ 60 Function Pun at - May Brea F	ศลy 12,95 โต:46 ง 15.95 ใก:35 − Harm Ret.Time
13 Unkinoten 14 Unkinoten 15 Unkinoten 16 Unkinoten 16 Unkinoten 16 Unkinoten 19 Unkinoten	24.81 m/s 127.9 m/s 280.1 m/s 280.1 m/s 485.1 m/s 127.1 m/s	-No- 135.3 sec -No- 169.0 sec -No- 190.8 sec -No- 205.0 sec
20 Uni noun 31 Uni noun	761-05 8075 24.81 mUS 72.49 mUS	-Ho- 20510 sec   -Ho- 2551 sec   -Ho- 2551 sec   -Ho- 2551 sec   -Ym.P -Ho- 3151 sec   -Ho- 4731 sec   -Ho- 47
- Detected 21 pea	ds. Use t 4 to ver	1011 f 605 sec]

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SB7_7-5.5 ليد ١٥٥١ 11.59

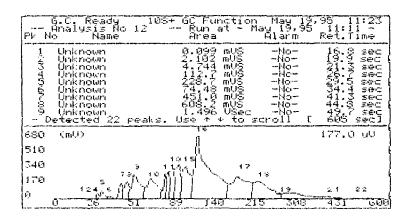


(55.

G.C. Ready Hhalysis No Ph No Name	105+ GC Fu 10 Run Area		19,95   11:01 95   10:48 - Ret.Time
7 Unknown 8 Unknown 9 Unknown 10 Unknown	76.47 1946 81.20	: USec — Ho— - USec — Ho— - HSec — Ho— - USec — Ho—	46.7 sed 60.1 sed   132.8 sed 265.3 sed
11 Onknown 12 Onknown 13 Onknown	599.5 675.0 2.547 1.426	mUs -No- MUS -No- USec -No-	297.8 263   357.0 263   375.6 262 480.0 263
15_ Սոհրօպոլ_			

5B7-1-5.5 25 ml

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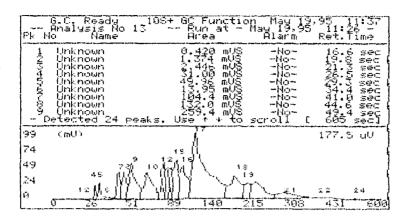


5.C. Ready 10 Analysis No 12 Pk No Name	95+ GC Function Run at - M Anea	May 19 lay 19,95 Alarm	.95 11:24 11:11 - Ret.Time	
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unknown 17 Unknown 17 Unknown 17 Unknown 18 Unknown		-No- -No- -No-	00000000000000000000000000000000000000	TCE
680 (mV)	11		164.5 uU	i

1,000

	[	Ģ.C.	Peadu Wale No	105+	di Fun	gtion.	Mag 19, 19,95 Harm	95 11	: 24 ]
	į.	4 No	Hawe Asia Ho	1.6	- gun a Area	118	larm	Ret. Ti	ne l
		14 Unki	nosun nosun		2-347	USec USec USec USec MUSec MUSec MUSec MUSec MUSec MUSec	No	9.190.641.62 117.6547.61.5 117.6547.61.5 4 60	sec   sec
		té Unio	nown nown		14,44	ÚŠeć ÚŠec	-No-	112.9 ( 170.8 )	Sec )
		15 Unit	กอิเกา กอิเกา		6.905 9.589	ÚŠēć mUS	~}\d~ ~\do~	208.6 s 254.4 s	ಾಕಂಡ ( ತಾರಾದ (
		CO Unika Zi Unika	ԻՐԾԱՄՈ ԻՐԾԱՄՈ		4.442 1.695	USéc ÚSéc	-Ho~ -No~	377.7 378.7	a⊕c   Kec
			nown ted 22 p	oeala. U	344.2 Jae * 4	mUS ∵to scr	-No-	481.2 605 s	sec
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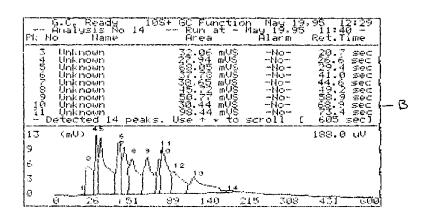
587-1-7.5 10 ul 10.5



10 Unknown 279.4 mUS -No- 59.8 sec 11 Unknown 8.427 mUS -No- 68.6 sec 12 Unknown 8.437 mUS -No- 78.6 sec 13 Unknown 194.3 mUS -No- 78.6 sec 14 Unknown 194.3 mUS -No- 82.4 sec 15 Unknown 194.3 mUS -No- 82.3 sec 15 Unknown 463.5 mUS -No- 82.3 sec 16 Unknown 463.5 mUS -No- 17.7 sec 17 Unknown 463.5 mUS -No- 17.7 sec 18 Unknown 818.1 mUS -No- 17.2 sec 18 Unknown 818.1 mUS -No- 17.2 sec 18 Unknown 818.1 mUS -No- 17.2 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 17.5 sec 18 Unknown 818.1 mUS -No- 18 Sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18 Unknown 82.3 sec 18	6.C. Readu Analysis No 13 Pk Ho Name	105+ GC Function Run at - M Area	May 19, ay 19,95 Alarm	95   1.38   11:26 -   Pet.Time	
	11 Unkingun 12 Unkingun 13 Unkingun 14 Unkingun 15 Unkingun 16 Unkingun 17 Unkingun 18 Unkingun	245.9 mVS 194.3 mVS 214.0 mVS 451.0 mVS 463.5 mVS 2.04.1 mVS	~\do- -\do- -\do- -\do- -\do- -\do- -\do-	60000000000000000000000000000000000000	-B

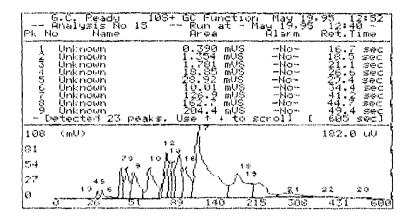
16 Unknown 463.5 mUS -No- 97.7 sec 17 Unknown 2.049 Usec -No- 170.4 sec 18 Unknown 810.1 mUS -No- 170.2 sec 19 Unknown 290.1 mUS -No- 194.0 sec 20 Unknown 665.5 mUS -No- 200.0 sec 21 Unknown 488.0 mUS -No- 200.0 sec 22 Unknown 5.568 mUS -No- 200.0 sec 23 Unknown 7.201 mUS -No- 200.0 sec 24 Unknown 2.201 mUS -No- 400.0 sec 24 Unknown 29.12 mUS -No- 400.0 sec 25 Unknown 29.12 mUS -No- 400.0 sec 26 Unknown 29.12 mUS -No- 400.0 sec	G.C. Ready Analysis No Pk No Hame	185+ GC Function 13 Run at - M Area	lay 19-95	5 11:39 11:26 - et.Time
	17 Unknoun 18 Unknoun 19 Unknoun 20 Unknoun 21 Unknoun 22 Unknoun 22 Unknoun 24 Unknoun	810,1 mVs 290,1 mVs 685.5 mVs 48568 mVs 7,201 mVs 29,12 mVs	+Ho- 1 +Ho- 2 +Ho- 2 +Ho- 2 +Ho- 4 +Ho- 4 +Ho- 4	12.4 5e67 76.4 5ee69 76.4 5ee69 76.5 5ee99 76.6 5ee99 76.6 5ee99

13.99



6.C. Readu	10S+ GC Functio	n May 19	,95 12:29	
Analysis Ao 14	Run at -	May 19,95	11:40 -	
% No Name	Area	Alarm	Ret.Time	
6 Unknown Funknown 8 Unknown 9 Unknown 10 Col hown 11 Unknown 12 Unknown 13 Unknown 14 Unknown	57.60.4.4.4.8.7.4 57.60.4.4.4.8.7.4 57.60.6.4.4.8.7.4 57.60.6.6.4.8.7.4 57.60.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6	-Ho- -Ho- -No- -Ho- -Ho- -No-	44-90-00-00-00-00-00-00-00-00-00-00-00-00-	   

587-25-3.5 10 ul 10.4 g

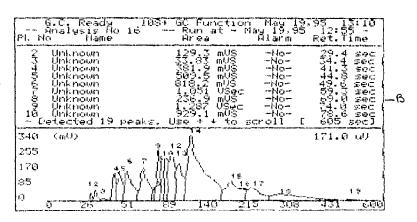


G.C. Ready 105 Analysis No 15 Pk No Hame	+ GC Function - Mun at - M Area	lag 19,95 Hag 19,95 Alarm	.95   12:54   12:48 =   Ret.Time	
16 Unknown 11 Uninown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 15 Unknown 17 Unknown 17 Unknown 17 Unknown 18 Unknown 18 Unknown 18 Unknown	22.1.2 mUS 22.1.2 mUS 23.1.2 mUS 23.46.3 mUS 25.46.3 mUS 25.46.3 US 26.47.4 US 27.48.5 US 27.48.5 US 28.4 4 4 5 4	-Na- -No- -No- -No- -No- -No- -No- -to- scroll f	50.1 sec 60.0 sec 75.6 sec 80.5 sec 172.2 sec 172.2 sec 1705 sec 1705	-B -Tce
			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	k

9.0 Ready (No Analysis No 15 Pk No (Name	f GC Function Pun at - Ma Area	May 19 ng 19.95 Alarm	.95 12:54 12:40 - Ret.Time
15 Unkinosen 16 Unkinosen 17 Unkinosen 18 Unkinosen 20 Unkinosen 21 Unkinosen 24 Unkinosen 25 Unkinosen 26 Unkinosen	553.1 mUS 449.4 mUS 2.079 USec 1.185 USec 8.614 mUS 544.6 mUS	-Ho- -Ho- -Ho- -Ho- -Ho-	89.6 sec 97.9 sec 110.5 sec 170.8 sec 207.8 sec
- Defected 23 peaks.	379.8 mVS 1.638 mVS 21.54 mVS	-No- -No- -No- -No-	270.1 sec 250.3 sec 482.0 sec 605 sec1
108 (mU)			175.0 aU
27 45 M \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	140 215	<u> 308</u>	22 29 431 690

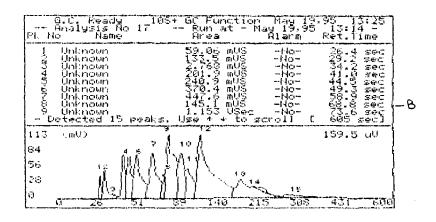
587-2-5.5 10ul 9.2g

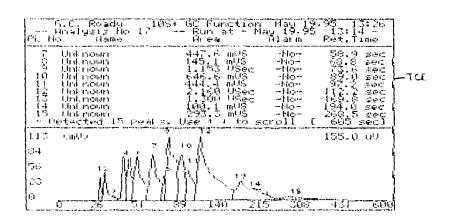
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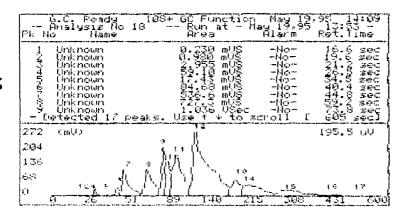
G.C. Ready 185 - Analysis No 16 Pk No Name	+ GC Function Run et - h Area	May 19 lau 19,95 Alarm	.95  3:12   12:55   Ret.Time	
11 Unlingun 12 Unknown 13 Unknown 14 Unknown 15 Unlingun 17 Unlingun 17 Unlingun 18 Unknown 19 Unknown	906.8 mUS 2.039 USec 1.842 USec 7.632 USec 3.356 USec	-No- -No- -No- -No-	82.5 sec 89.6 sec 112.6 sec 112.2 sec	_TCF_
th thingoun 17 Unknown 18 Unknown 19 Unknown - Detwetted 19 reaks.	14.51 mUS 1.979 USec 3.385 USec 178.3 mUS Use ↑ + to s	-Ho- -No- -No- -No- -No- 	194.2 sec 206.2 sec 270.6 sec 479.6 sec 605 secl	
3403 (mD)	12 /		(84.5 al)	

587-2-7.5 10 ul 11.5 g



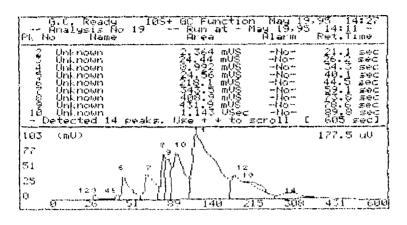


587-3-7.5 10ul 10.6g



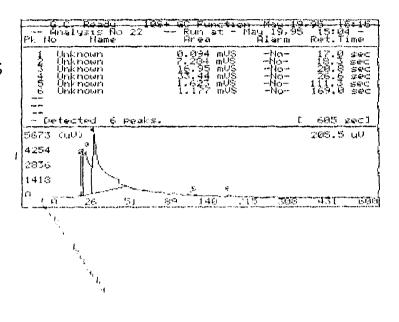
G.L. Fends 10 - Ghalysis fo 18 Fl Ho Name	PSA GC Function Pun at - M Area	์ May 19 ay 19,95 ฝีโลกแ	.95 (4:09 	
9 Unitropin 19 Unitropin 11 Unitropin 12 Unitropin 13 Unitropin 14 Unitropin 15 Unitropin 15 Unitropin 16 Unitropin 16 Unitropin 17 Unitropin 17 Unitropin 17 Unitropin 17 Unitropin	1.830 Phys. 881.4 mU5 881.4 mU5 2.300 Phys. 6.154 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys. 6.159 Phys	tio: tio: tio: tio: tio: tio: tio: tio:	170.0 sec 170.7 sec 170.8 sec 170.8 sec 170.8 sec 170.7 sec 170.7 sec 170.7 sec 170.7 sec 170.7 sec 170.7 sec	.∓CE
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587.3-5.5 10 ul 9.2g



U.C. Ready	US+ GC Function	Nag 19	.95 [4:28	
→ Analysis No 19	- Run at - M	ay 19,95	[4:11	
Pt No Hame	Area	Atarm	Red. Time	
ig Unitropora i Hatterpoora 3 Unitropora 4 Unitropora 10 Unitropora 11 Unitropora (3 Unitropora 14 Unitropora 14 Unitropora - Delbected 14 peal		-Ho- -Ho- -Ho- -Ho- -Ho- -No- -No- -Ho- -H	44.0 aec   52.1 aec   52.1 aec   52.1 aec   52.2 aec   51.1 aec   52.2 aec   51.1 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec   50.2 aec	TCE

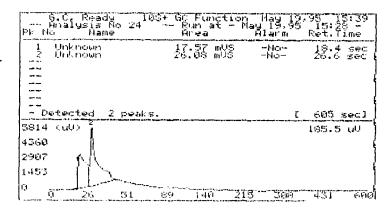
5B7-4-\$.5 100 wl 13.8g



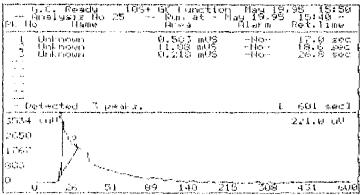
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Principals House		Hay 19.9° HISTO	
1 Unitropin 2 Unitropin 3 Unitropin 4 Unitropin 5 Unitropin 6 Unitropin	0.047 mUS 2.789 mUS 11.49 mUS 2.270 mUS 6.325 mUS 6.337 mUS	No Ho Ho Ho Ho	16.2 sec (1),4 sec 20.4 sec 26.5 sec 01.4 sec 111.7 sec
Instented to peak	ā a		[ 085 sec
2347 2247 1498 749	5 6		2002.5 uU
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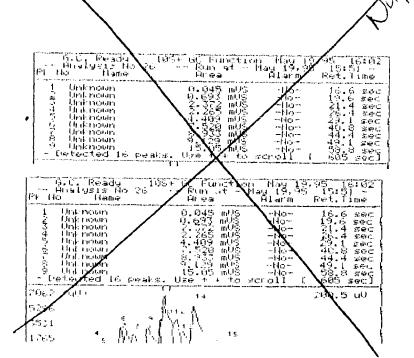
587-4-**5**.5



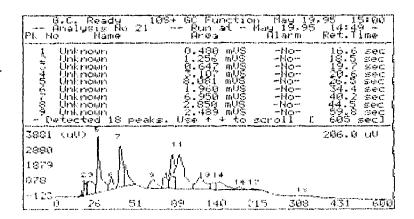
587-4-7.5



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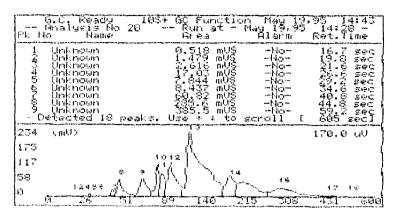


987-3-1.5 10 ul 11.4 g



into Reads II - Analysis No 21 Pl. No Name	554 GC Function - Run at - M Area	May 19 ลบ 19,95 ผีไละแก	14:49 ~	
10 Uni nown number this this this nown 12 Uni nown 13 Uni nown	4.654 mUS 13.69 mUS 22.38 mUS 5.099 mUS	-110- -110- -110- -110- -110-	69.0 sec 79.7 sec 88.7 sec 112.5 sec 122.0 sec	_В тс!;
11 Upd. record 12 Upd. record 13 Upd. record 14 Upd. record 15 Upd. record 15 Upd. record 17 Upd. record 18 Upd. record 18 Upd. record 19 Upd. record	2.451 mUS 6.252 mUS 2.211 mUS 1.275 mUS 0.514 mUS 5. Use 1 to a	ellige ellige ellige ellige	136.5 sec 169.2 vec 199.2 sec 298.4 sec	- E
13881 (DU)	and the grade of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the		202.0 UU	i

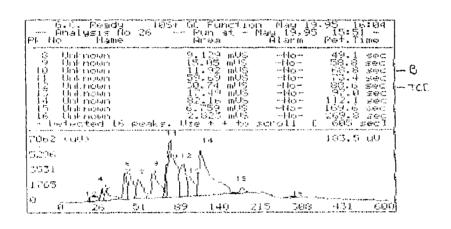
SB7-3-3.5 10 ml 9.7g



18	G.C. Ready - Analysis No ( k No Name	lØS+ GC Function O Run at - h Hrea	i May 19 May 19,95 Alarm	,95 14:44 14:20 - Ret.Time	
10 Onknown 14.29 mUS -No- 472.8 sec ) tenected 16 peaks. Use ( 4 to scroll [ 605 sec ]	11 Historium 12 Unknown 13 Unknown 14 Historium 15 Historium 15 Unknown 17 Unknown	510.9 mUS 1.421 USec 5.485 USec 1.463 USec 2.112 USec 2.524 USec 15.76 mUS	-No- -No- -No- -No-	174.2 sec 271.2 sec 403.3 sec 472.8 sec	-T( f.

2 Unknown 6.593 mVS -No- 19.6 s 3 Unknown 2.372 mVS -No- 21.4 s 4 Unknown 2.255 mVS -No- 26.4 s 5 Unknown 4.469 mVS -No- 29.1 s 6 Unknown 7.328 mVS -No- 44.8 s 7 Unknown 8.933 mVS -No- 44.4 s 8 Unknown 9.129 mVS -No- 49.1 s 9 Unknown 15.85 mVS -No- 58.8	90 90 90 90 90 90 90 90 90 90 90 90 90 9
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7062 (u0) 5296 3531 1765 0 26 51 89 140 215 308 431	NJ Tarrasi

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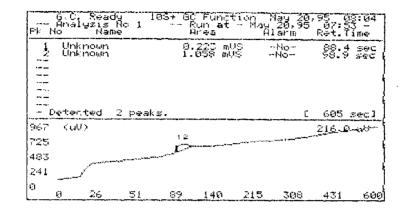
100 M

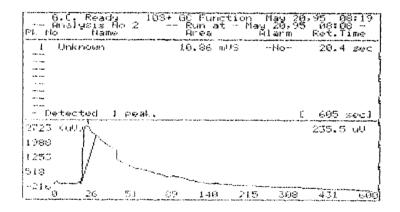
G.C. Ready Analysis R Pk No Name	10S+ GC Fu 27 Run Ares	at - Mau 19:	.95 16:คื6 -
3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 10 Unknown 11 Unknown - Detected 11	19.21 69.54 151.4 162.1 142.1 147.8 187.4 187.40 Peaks. Use	mUS -No- mUS -No- mUS -No-	269.8 sec ( 269.8 sec ( 269.8 sec ( 143.8 sec ( 201.6 sec ( 2721.6 sec ( 2721.6 sec (
37 (mU) 27 13 4 9 12	51 89 14	7 10 215 31	229.8 uV

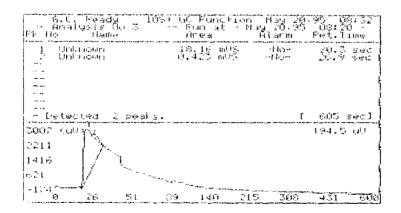
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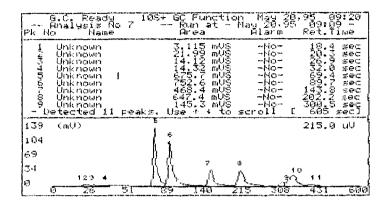
G.C. Read Analysis Fk Ho Nam	No 28 -~ Ru	Function n at - Ma ea	May 19, u 19,95 Alarm	95 16:39 16:17 Ret.Time
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132 :mU) 99 66 57 1294		7	10 3 / 1	191.5 aV

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	Total	351.1	730.5	306.2	7143.4	3000.3	4285.2	17314.1	4829.	176.4	10222.9	25592.4	15181.2
	o-XYLENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
m,p-	XMENE	0.0	47.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ETHYLBENZENE	0.0	289.1	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0
	껉	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOLUENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	벌	335.4	219.7	218.9	7143.4	2997.4	3711.3	15466.2	3923.7	137.0	10222.9	25592.4	15181.2
	BENZSNE	:5.7	17.4.4	87.3	0.0	2.9	573.9	1847.9	905.4	29.3	0.0	0.0	0.0
	SAMPLEID	SB7-1-1.5	SB7-1-3.5	SB7-1-3.5 D	SB7-1-5.5	SB7-1-7.5	SB7-2-3.5	SB7-2-5.5	SB7-2-7.5	SB7-3-1.5	SB7-3-3.5	SB7-3-5.5	SB7-3-7.5



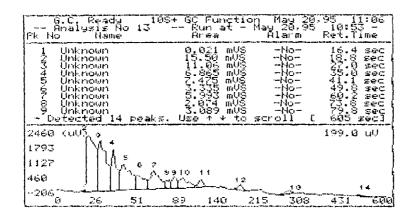






G.C. Readu Analysis No 7 w No - Name	108+ GC function Run at - l Wrea	n May 20,95 09:22 May 20,95 09:09 — Mlarm (0t.Time
3 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 10 Unknown 11 Unknown 11 Unknown 11 Pertad 11 Per	14.12 mUS L4.25 mUS 55.4 mUS 752.6 mUS 463.4 mUS 647.4 mUS 685.9 mUS 685.9 mUS 146.2 mUS	-No- 26.9 sec -No- 52.6 sec -No- 69.7 sec -No- 149. 3 sec -No- 199. 3 sec -No- 204.0 sec -No- 304.0 sec -No- 304.5 sec
.59 CipU) 69 64		207.5 GU د المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة

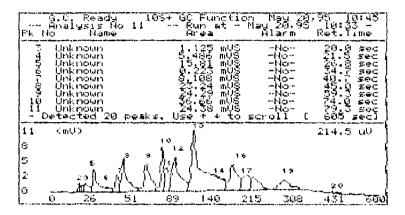
587.5-1.5 10 ml



G.C. Ready	185+ GC Flanction	May 20,	95
Analyzis No 13	Run at - M	Jay 20,95	
Pt No Hame	Area	Atarm	
6 Unknown 7 Unknown 3 Unknown 9 Unknown 10 Unknown 11 Unknown 12 Unknown 14 Unknown 14 Unknown 14 Unknown	3.335 mVS 5.937 mVS 2.074 mVS 3.689 mVS 4.960 mVS 2.811 mVS 2.431 mVS 1.10. mVS 1.10. mVS	- No- - Ho- - Ho- - No- - Ho- - Ho- - Ho- - Ho- - Ho- - To-	49.0 mec   10.0 mec

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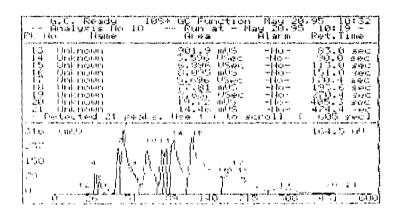
587-5-35 25 M



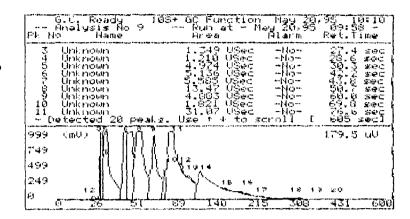
G.L. Ready	185+ GL Functio	m May 20	,95   10:46
Unalysis No	11 Run at -	May 20,95	10:35 -
M. No Name	Area	Alarm	Rat.  100
12 Unit room 13 Unit moon 14 Unit moon 15 Unit moon 16 Unit moon 17 Unit moon 18 Unit moon 18 Unit moon 19 Unit moon 10 Unit moon 10 Unit moon 10 Unit moon 10 Unit moon 10 Unit moon	\$6,16 mU/ 177.V mU/5 1.75.2 mU/5 1.75.2 mU/5 15.75 mU/5 44.47 mU/5 36.25 mU/5 55.25 mU/5 -0547. Use 1 15	ettorialiania Atominaliania Atominaliania Atominaliania Atominaliania Atominaliania Atominaliania	110.1 sec 110.1 sec 170.4 sec 170.4 sec 170.4 sec 170.4 sec 170.3 sec 170.5 sec 170.5 sec 170.5 sec

1884 80 Function May 20.95 10:32 - Run at - May 20.95 10:19 -Area Alarm Ret.Time G.C. Ready -- Analysis Mo LO Pk No Hame 201.8 mUS -No-1.4.9 mUS -No-77.23 mUS -No-589.3 mUS -No-64.83 USec -No-64.83 USec -No-1.503 USec -No-1.010 USec -No-1.010 USec -No-1.010 USec -No-Use + 4 to scroll 26.0 sec 25.0 sec 25.0 sec 25.4 sec 45.1 sec 45.1 sec 45.2 sec 45.2 sec 45.6 sec 174.6 sec 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 14 Unknown 12 Unknown 1 Octocted 21 peaks. 177.0 UU 316  $CU_{MD}$ 237 19178 158 12 29 19 20 21 Ø 300 431 500

587-5-5.5



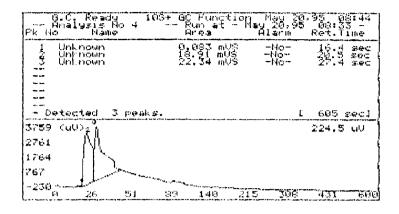
587-5-7.5 5 يىل



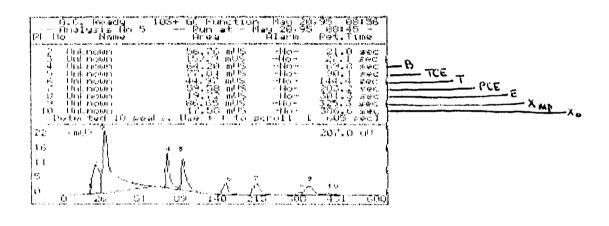
6.0. Readu	105+ GC Function		.95   10:11
Analysis No 9	Run at - M.		80:58 -
Pl No Name	Arwa		Ret.Time
12 Unknown 15 Unknown 14 Unknown 15 Unknown 15 Unknown 17 Unknown 17 Unknown 20 Unknown 20 Unknown 20 Unknown 20 Unknown	290.4 m//5 (74.3 m//5 124.55 m//5 81.35 m//5 61.35 m//5 143.35 m//5 45.35 m//5 3.415 m//5	e Home chome chome chome chome chome chome chome chome chome	50.7 sec 90.2 sec 111.4 sec 141.4 sec 140.4 sec 201.4 sec 201.4 sec 201.6 sec 200.6 sec

6.C. Ready - Analysis No 8 Pk No Name 185+ GC Function May 28,95 09:55 -- Run at - Nay 20,95 09:44 -- Area Alarm Ret.lime 0.555 mUS -No1.046 mUS -No514.5 mUS -No43.65 USec -No43.65 USec -No43.65 USec -No43.65 USec -No56.3 USec -No56.3 USec -No56.3 USec -No-Unknown
Unknown
16.7 sec 16.6 sec 16.8 sec 16.8 sec 16.8 sec 16.2 sec 115.2 sec 14.5 sec 14.5 sec 土のようなのはいのか 587-5.7.5 io ul 177.0 uU 999  $\in U_{m,\ell}$ 749 499 10 249 12.1418-18 Ø

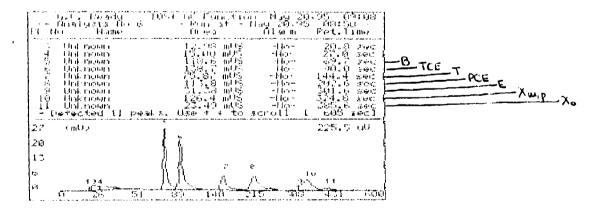
G.C. Ready	188+ 60 Function	n Hay 20	.98 (09:55
- Analysis No S	- Run at	Hay 20.95	09:44 -
PL No Name	Area	Alarm	Ret.lime
9 Unk noom	365.2 MUS		143.4 sec
10 Unk noom	200.1 MUS		170.6 sec
11 Unk noom	207.9 MUS		207.6 sec
13 Unk noom	23.22 MUS		256.9 sec
13 tinkmoon	63.12 mUS	- Marin	267.0 sec
14 tinkmoon	79.19 mUS	- Marin	277.3 sec
15 tinkmoon	295.8 mUS	- Marin	323.7 sec
16 tinkmoon	46.83 mUS	- Marin	381.0 sec
- 17 - Unitrown	31.01 mU5	-do-	480.4 sec
Pertected 17 pes	akaa UMe 4 to	scroll Lat	605 seci

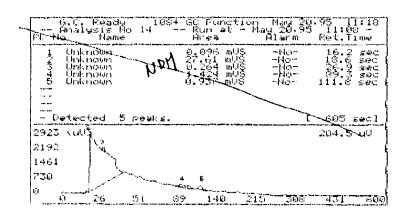


10 ug/l



50 ug/l 100 ul

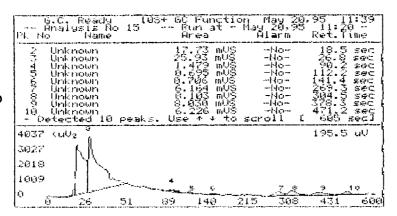


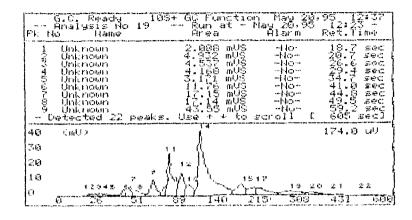


13.0.1 Hiraliya 11.165		+ St. Flare tron Pun art - H Hrws	May Tela ay 20.95 Alarm	78 11:37 11:70 Pot. 11ma
1 Under Under Under Under Under Under Under Under Under	960  1 260  1 260  1 260  1 260  1	0.506 m/5 17.75 m/5 25.75 m/5 1.479 m/5 1.695 m/5 0.706 m/5 6.103 m/5 8.103 m/5 bet to to	-Ho -Ho -Ho -Ho -Ho -Ho -Ho -Ho -Ho	15.8 mm 10.0 mm 26.0 mm 29.2 mm 114.3 mm 204.6 mm 204.6 mm 204.5 mm 204.5 mm
4037 FOU. 7027   7013 1003		4		194.5 aU
امريق ه	15 m 7 m 26 m 26 m 26 m 27 m 27 m 27 m 27	क्कि. के <u>के</u> एक् चिंगे की	5 - <u>506</u>	4.31 (30)

The December 1455 to 16 to be to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 to 16 t

587-6-3.5 100 ml

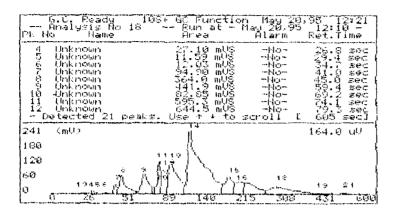




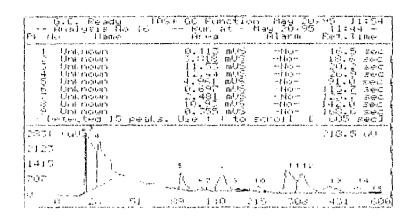
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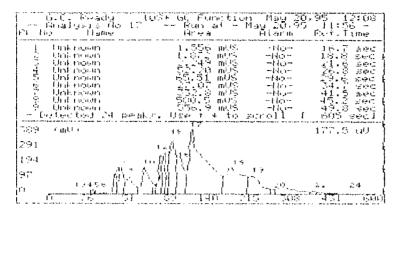


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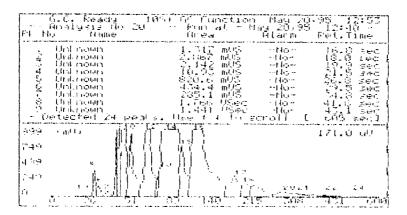
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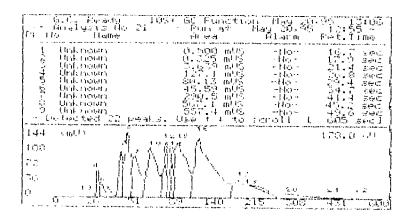
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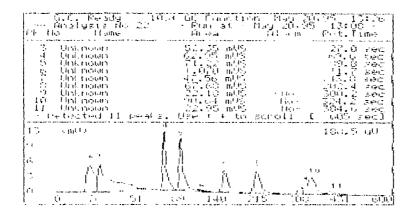
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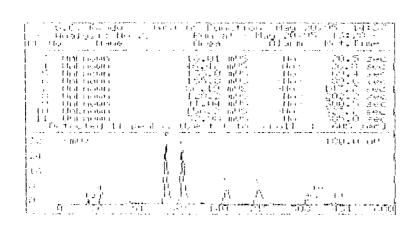
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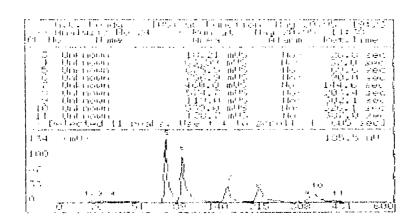


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SB7-5-5.5	0.0	16390.0	0.0	0.0	0.0	0.0	0.0	16390.0
SB7-5-7.5	0.0	0.0	5430.4	0.0	0.0	0.0	0.0	5430.4
SB7-5-7.5	34880.4	4752.2	2425.5	1624.2	0.0	781.2	265.8	44729.4
SB7-5-1.5	0.0	2.1	0.0	0.0	0.0	0.0	0.0	2.1
SB7-6-3.5	0.0	6.0	0.8	0.0	20.3	5.2	44.6	71.8
SB7-6-5.5	0.0	2.8	11.1	0.0	52.9	0.0	0.0	8.99
SB7-7-1.5	4059.7	0.0	0.0	17318.5	83207.6	0.0	1829.4	106415.1
SB7-7-3.5	63.3	259.9	0.0	332.4	11.9	136.2	21.0	824.8
SB7-7-5.5	604.2	10124.5	0.0	9523.1	0.0	0.0	326.2	20578.0
SB6-7-7.5	1632.3	18665.8	0.0	0.0	82930.5	0.0	18454.7	121683.3

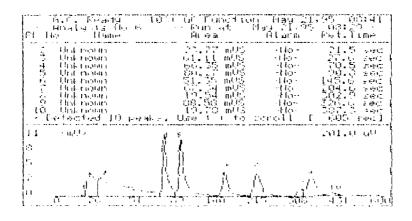
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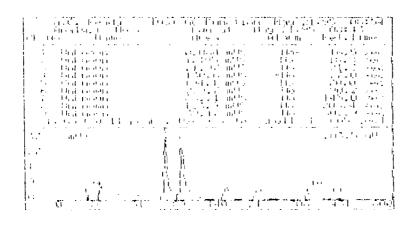
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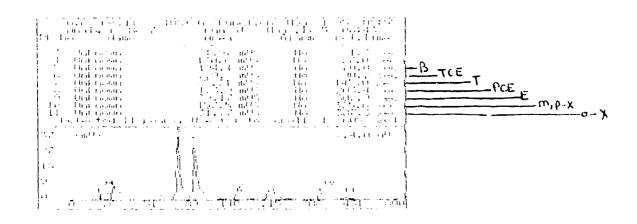
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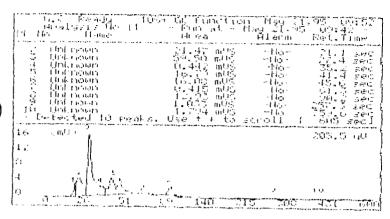
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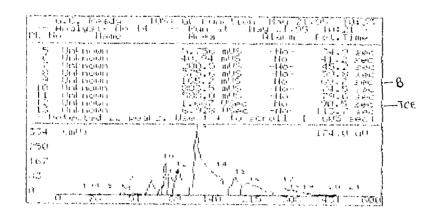
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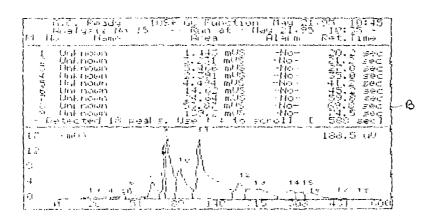
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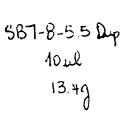


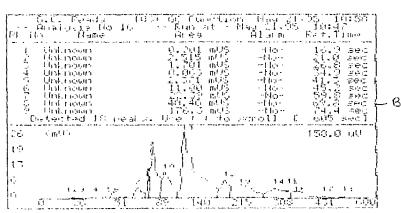
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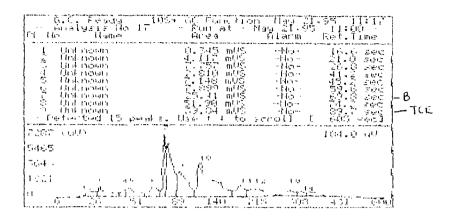
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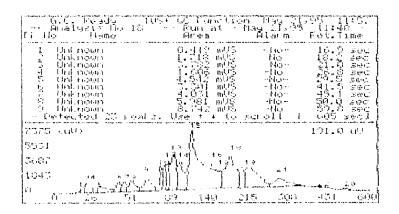
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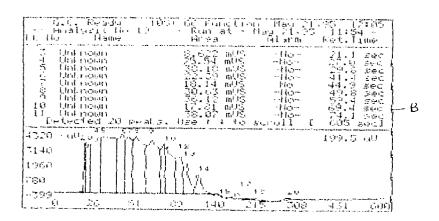
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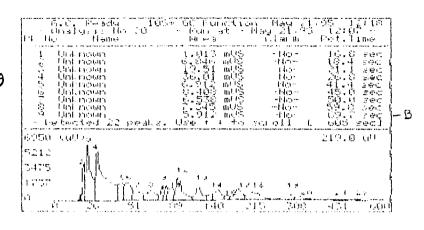
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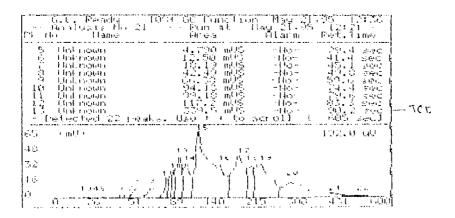
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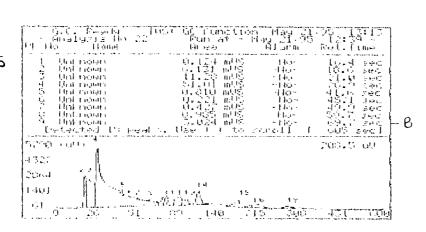
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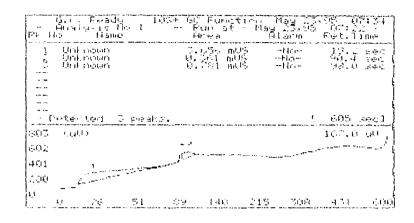
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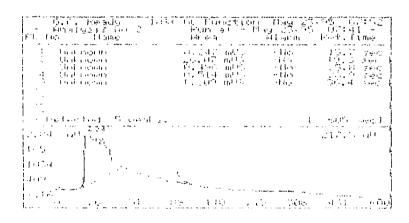
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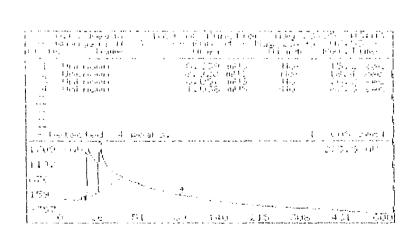
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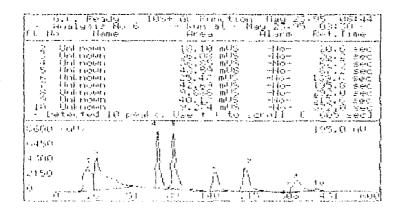




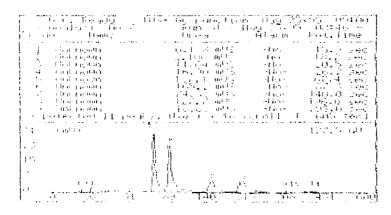
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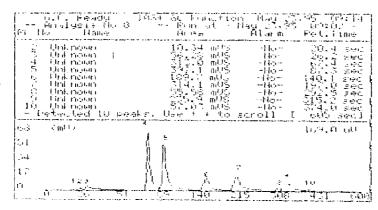


50 mg/l std 100 ml

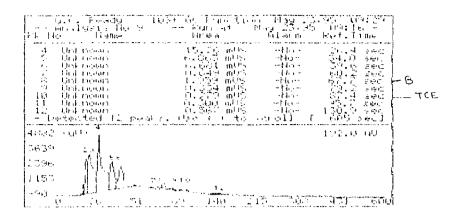


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500 reg/2 std 50 ml



MW31 (Dev. water) 100 ul



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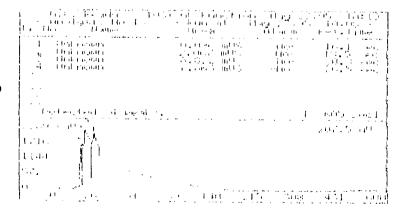
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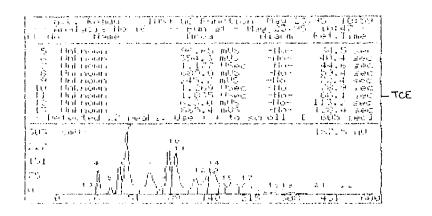
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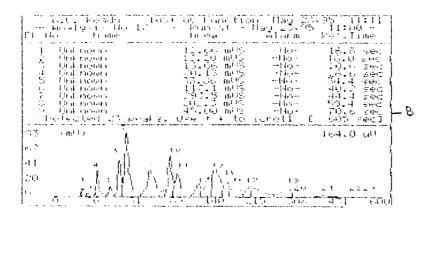
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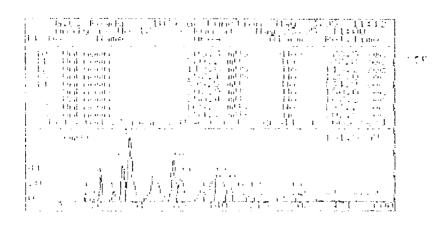
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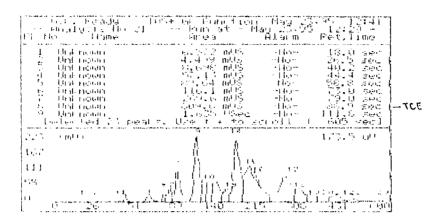
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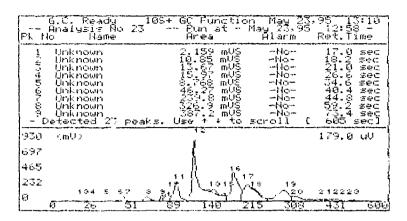
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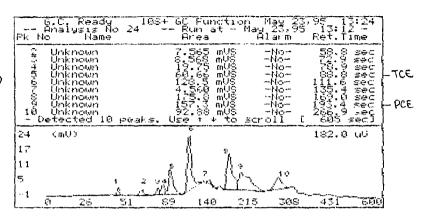
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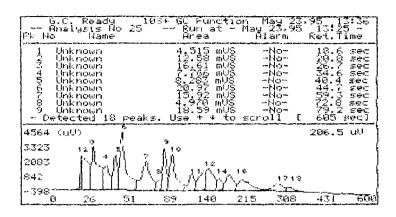
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15	G.C. Peady 1 Amalysis No. 23 Pt No. Mame	03+ U. Tunction Pun at - b Ones	1 May 55 1ay 25,95 Alam	,35  3:11   12:58   Pet.Time	
	16 Onlinoum 17 Unit nown 10 Unit nown 19 Unit nown 20 Unit nown 21 Unit nown 22 Unit nown 23 Unit nown	6.619 USec 212,7 mUS 5.457 USec 2.505 USec 947.8 mUS 1.398 USec 872.0 mUS	-115	1900 a seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo del seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo del seculo del seculo de la seculo de la seculo de la seculo de la seculo del seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo del seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo de la seculo d	_ X.

587-10-7.0 100 ul 10.8

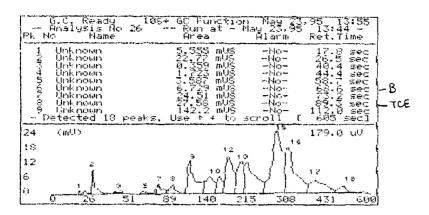


567-9-8.0 100 ul 12.3g



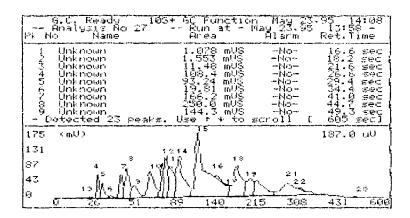
G.C. Readu - Analysis Ro Pk Ho Hame	1084 GC Functio 25 Run at - Area	n May 25, May 25,95 Alarm	95 17:38 13:25 - Ret.Time	
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 15 Unknown 16 Unknown	25.02 mUS (0.95 mUS (5.75 mUS (9.755 mUS (9.755 mUS (9.757 mUS	No- Ho- Ho- Ho- Ho-	113.7 sec 128.9 sec 136.4 sec 158.6 sec	TCF.
18 Unkriguni	22.07 mUs 24.14 mUs 17.5e mUs 4.399 mUs eaks. Use + + fo	-No- -No- -No- -No- -No-	189.2 sec 194.4 sec 368.8 sec 301.8 sec 605 sec1	-pce

387-11-1.5 20ml 14.7g



10 Unknown	6.C. Ready Analysis Ao Mk No Hame	188+ GC Functio 26 Run at - Area	n May 23 May 23,95 Alarm	.95 13:56 13:44 Pet.Time	
17 Unknown	11	120.1 mVS 27.5.4 mVS 57.1.6 mVS 511.6 mVS 28.61 mVS	- No- -No- -No- -No- -No- -No- -No-	194.66 see co 194.47 see co 195.47 see co 2014.56 see co 469.66 see co 469.66 see co	PCE Xo

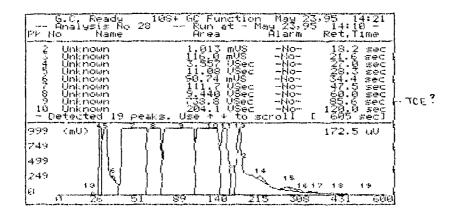
587-11-3.5 20 ml 10.8 g

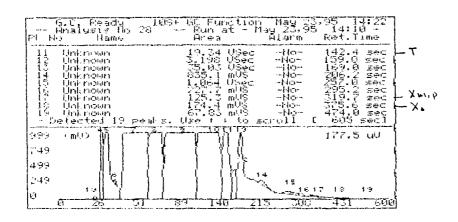


6.C. Ready 189	+ GC Function	May 25:	.95 14:09	
- Analysis No 27	Pun at - M	ay 25:95	13:58 -	
PL No Name	Area	Alarm	Ret.Time	
18 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 15 Unknown 16 Unknown 17 Unknown 18 Unknown 18 Unknown 18 Unknown 18 Unknown	347.7 mUS 324.2 mUS 515.4 mUS 515.4 mUS 1.1457 USec 52.91 mUS 1.471 USec USe + + to s	~No~	59.0 sec 65.4 sec 59.2 sec 59.2 sec 175.5 sec 175.5 sec 176.5 sec 176.5 sec 1665 sec	-B -705

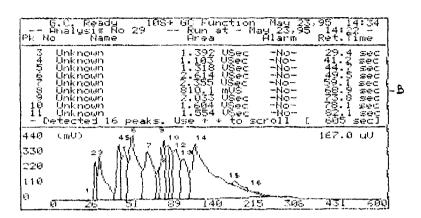
G.C. Peady I	NS+ GC Function	Mag 23	.95 (4:89	
Analysis No 2.	Pun at - Ma	ay 23.0%	13:58 -	
Pl No Name	Area	Atarm	Met.lime	
15 Unknown 16 Unknown 17 Unknown 18 Unknown 19 Unknown 20 Unknown 21 Unknown 21 Unknown 22 Unknown 23 Unknown 24 Unknown 25 Unknown 26 Unknown	1.471 Used 688.3 mUS 847.4 mUS 1.684 Used 32.95 mUS 36.64 mUS	-140- -140- -140- -140- -140-	169.5 sec   195.6 sec   205.2 sec   208.9 sec   470.4 sec	.fcr

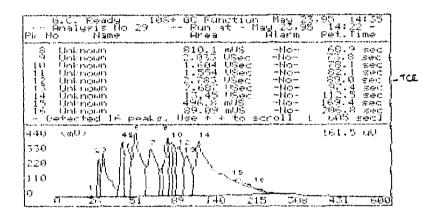
387-11-5.5 2021 12.69



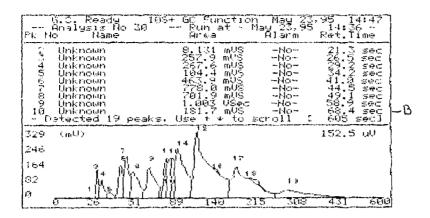


387-11-5.5 5.ul 12.6 g



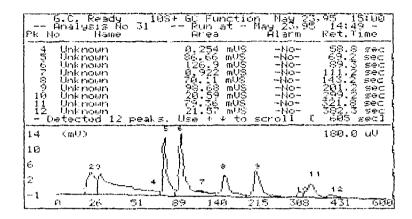


587-11-6.5 10ml 10.49



{	h.C. Peady Analysis No 1 No Name	(89+ 50 Function 30 Rum at - K Area	i Nay 23 ay 23.45 Alarm	.95 14:48 14:36 - Ret.Time	
	11 Und nown 12 Und nown 13 Und nown 14 Und nown 15 Und nown 15 Und nown 16 Und nown 17 Und nown 18 Und nown 19 Und nown 19 Und nown 19 The followin	9.77.8 mUS 980.1 mUS 741.9 mUS 7.498 USec 7.531 USec 55.79 mUS 6.77.5 mUS 6.77.5 mUS 7.828 USec 7.828 USec 980 t 4 to 5	Ho Ho Ho	73.4 sec 78.6 sec 81.7 sec 112.1 sec 112.1 sec 112.4 sec 162.6 sec 1685 sec	- TCC

10 eg/Pstd 8**5**0 el



50 Jun 50 std

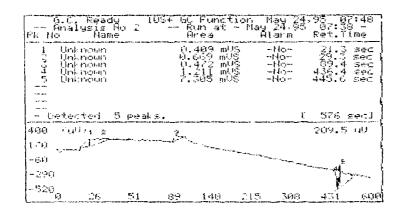
6.8. Aral M. No	Ready ysis No 32 Hame	1884 GC Ac Ar	Function mat — ea	n May 2 May 23.95 Alarm	3-95 (5:12 5 15:01 - Ret.Time
4 Unk 5 Unk 6 Unk 7 Unk 8 Unk	noun noun noun noun noun noun noun	27. 27. 17. 16.9 16.9 18.	88 mUS 1.2 mUS 1.3 mUS 1.5 mUS	-Ho- -Ho- -Ho- -Ho- -Ho- -Ho-	20.8 sec 26.6 sec 68.6 sec 88.9 sec 142.6 sec 200.2 sec 200.2 sec
	nown nown ted 11 pes	152 33	1.3 mUS 03 mUS	~Mo~ ~Mo~	\$21.6 sec \$82.0 sec 1 605 sec1 184.5 uV
29 19				*	
ig G	104	<u> </u>	14A	A 3 363	१० ८ ११ चित्राहरू

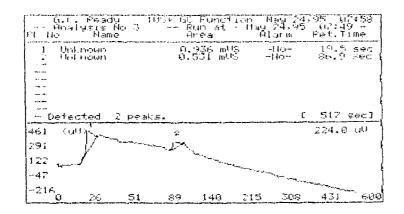
500 rm/lstr 50 ml

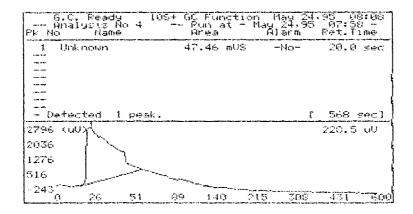
n.C. Feadu Analysis No 33 Pr Ho Hame	195+ GC Function Run at - N Area	May 23.95   15:24 ay 23.95   15:14 - Alarm Rel.Time
4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 9 Unknown 10 Unknown 11 Unknown 12 Unknown 12 Unknown 12 Unknown	16.50 mUS 79.36 mUS 79.36 mUS 79.36 mUS 867.4 mUS 456.4 mUS 789.3 mUS 1527.7 mUS 1527.8 mUS 1527.4 mUS 1527.4 mUS	-No- 06.6 sec -No- 68.8 sec -No- 69.8 sec -No- 142.0 sec -No- 1208.8 sec -No- 208.8 sec -No- 382.8 sec -No- 382.8 sec -No- 382.8 sec -No- 582.8 sec
151 (mU) 113 75 37	\$ 7	202.5 uV
n 1945 n 76 51	$\frac{1\sqrt{140}}{99} \frac{\sqrt{140}}{140} \frac{\sqrt{140}}{21}$	\19.

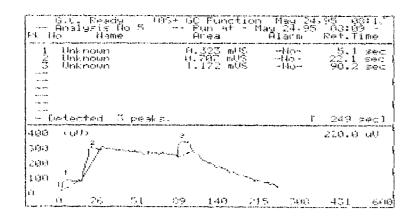
SAMPLEID	BENZENE	ם	TOLUENE	<u> </u>	ETHYLBENZENE	m,p- XYLENE	o-XYLENE	Total
MW31	9.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7
SB7-9-1.5	0.0	880.8	0.0	0.0	0.0	0.0	0.0	880.8
SB7-9-3.5	24.5	118.6	0.0	0.0	0.0	0.0	476.9	619.9
SB7-9-5.5	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.2
SB7-9-8.0	0.0	10.4	0.0	13.2	0.0	0.0	0.0	23.7
SB7-10-4.0	0.0	338.1	0.0	0.0	0.0	0.0	1686.3	2024.4
SB7-10-5.0	0.0	1775.2	0.0	6524.1	0.0	0.0	4499.1	12798.4
SB7-10-5.0 D	0.0	1209.5	0.0	4789.5	0.0	0.0	3976.4	9975.3
SB7-10-7.0	0.0	28.8	0.0	98.0	0.0	0.0	0.0	126.9
SB7-11-1.5	14.6	48.2	0.0	412.2	0.0	0.0	2725.2	4230.1
SB7-11-3.5	954.5	2720.2	0.0	2144.4	0.0	0.0	0.0	5819.1
SB7-11-5.5	8177.3	22688.5	0.0	0.0	0.0	0.0	0.0	30865.8
SB7-11-5.5	0.0	0.0	0.0	0.0	0.0	395.9	2700.2	3096.1
SB7-11-6.6	6133.1	17275.1	0.0	0.0	0.0	0.0	0.0	23408.2

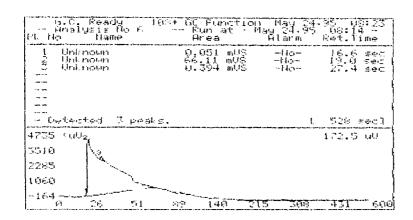
Ana Ana Pk No	lyzing lysis M Name	0 1 0 1	4 90 Pul Ar	Functi n at - ea	on May May 24 Hlar	, §4. , §5	95 07 07:20 R\$t.7	:30 ne
. 2 On	known known known		4.0 0.1 1.0	25 mUS 46 mUS 28 mUS	-No -No -No	_	33.0 87.8 99.7	560 560 560
- Dete	cted 3	peaks.				Ε	588 :	sec]
Outropic Co.	JJ 5						1.05	mU
<b>2000 (</b> 0							1.00	
2000 (C 1500							1.00	
1500			29					
2000 (6 1500 1000 500 0	1		20 		4			

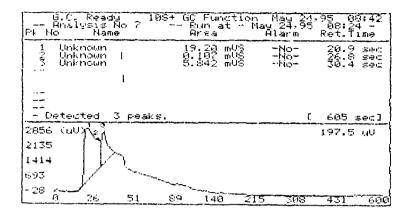




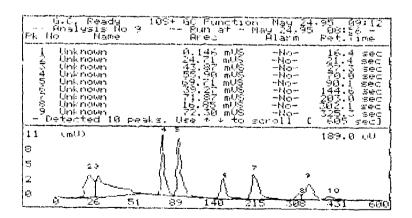


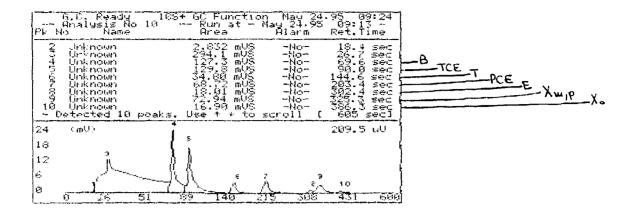


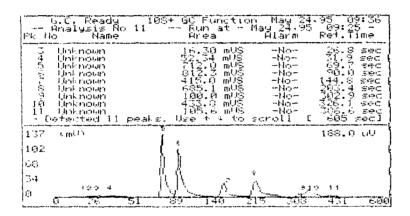


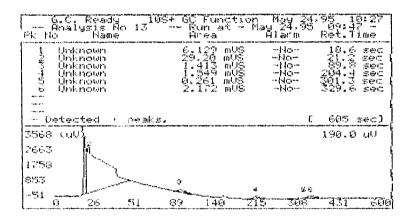


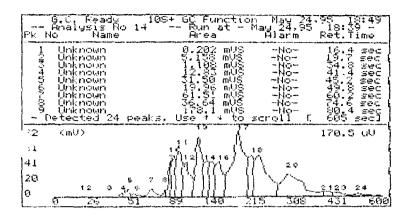
2 Unknown   2.639 mUS		95 08: 88:42 Ret.Tin	May 24, 24,95 Alarm	at - Na	GC Fun - Pun Area	lo 8 -	Read lysis Nam	· Whal	PF 1
50 (ml) 179.5 w 39 26	26888888888888888888888888888888888888	21.0 = 27.6 = 269.6 = 302.4 = 325.6	-No- -No- -No- -No- -No-	mUS mUS mUS mUS mUS	2.636 2.766 1.39.4 1.39.4 59.48		Choun Choun Choun Choun Choun Choun		07-10-04 PG-16-04
39 26	ec]	605 se	ξ			peaks.	ored	Detec	
26	ųŲ	179.5 (					(i)	€m₽	52
l i i						(			39
13    • 7						Ŋ			26
(1 AF			77	, E		W.			13
0   0   26   51   89   148   215   305   451	6.[1		<u> </u>	,'\ 	·	/_			Ø











G.C. Ready 1889 Analysis No 14 Pr No Hame	- GC Function Run at - h Area		.95 18:50 18:39 - Ret.Time	
t0 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown	243.5 mUS 490.1 mUS 386.6 mUS 663.6 mUS 505.0 mUS	-Ho- -Ho- -Ho- -Ho- -Ho-	54.0 sec 90.5 sec 98.9 sec 114.1 sec 124.5 sec	TCE
11 Unk nown 12 Unk nown 13 Unk nown 14 Unk nown 15 Hek nown 16 Unk nown 17 Unk nown 18 Unk nown 18 Unk nown 18 Unk nown 18 Unk nown	254.1 mUS 524.6 mUS 2.180 USAC 623.1 mUS	-Na- -No- -No- -No- scroll [	150.2 sec 158.1 sec 172.6 sec 196.6 sec 605 sec1	•
82 (mU)	75 /7		179.8 40	i d

5.C. Ready Analysis No Pt No Name	105+ GC Function 14 Eun at - 1 Area	i May 24 Yay 24.95 Alarm	.95 18:50 18:39 Ret.Time	
16 Unk nown 17 Unk nown 18 Unk nown 19 Unk nown 20 Unk nown 21 Unk nown 22 Unk nown 24 Unk nown 24 Unk nown 25 Unk nown	524.6 mUS 2.188 198e 625.1 mUS 1.47.2 USec 1.74.1 USec 4.997 mUS 159.1 mUS 111.6 mUS 111.6 mUS 118.6 mUS	-No- -No- -No- -No- -No- -No- -No- -No-	130.1 sec 130.6 sec 179.6 sec 179.6 sec 179.6 sec 179.6 sec 179.6 sec 179.6 sec	 
32 (mU) 61	٨٠٤.	18	172,5 uU	

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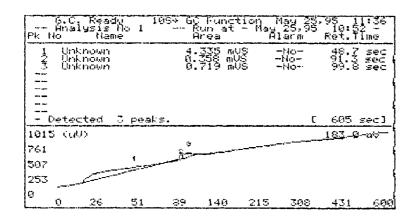
				-1111	i	1	1	سعنات الما	
1Đ				مبداليلي <u>ت</u>		215	309	4.51	600)
1	Ø	26	51	ଟ୍ର	140	210	4.00		
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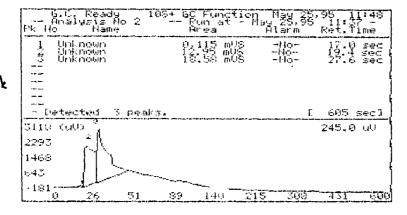
11 Unknown	G.C. Peadu Analysis No Pk No Hame	15 - Run at - M Area	May 24.95 19:03 ay 24.95 18:51 Alarm Ret.Time
Tr.47 mVS	12 Unk nown 13 Unk nown 14 Unk nown 15 Unk nown 16 Unk nown 17 Unk nown 17 Unk nown 17 Unk nown	64.08 a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules a mules	-No- 114.2 sec -No- 175.0 sec -No- 175.0 sec -No- 176.6 sec -No- 274.4 sec -No- 362.6 sec -No- 468.0 sec

SAMPLEID	BENZENE	<u> </u>	TOLUENE	52	ETHYLBENZENE	m,p- XMLENE	o-XYLENE	Total
SB14-3-5.5	0.0	2696.5	0.0	0.0	0.0	0.0	0.0	2696.5
SB14-3-7.5	0.0	681.7	0.0	0.0	0.0	0.0	0.0	681.7

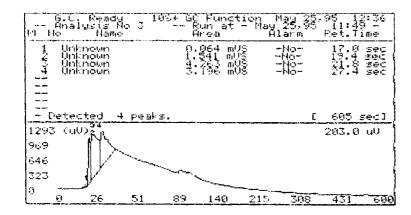
Machine Blank



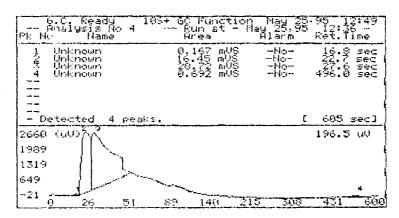
Syringe Blank 250B



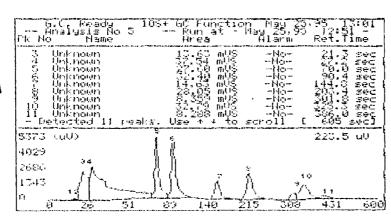
Method Blank 250 B



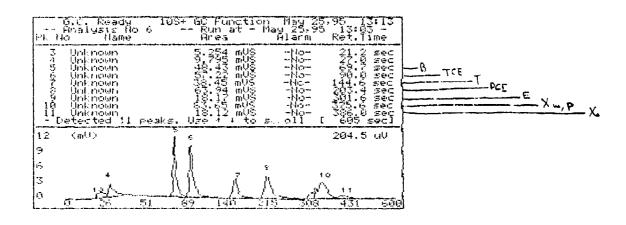
Syrings Black 250 A



10 mg/l stl 250 mg

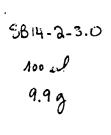


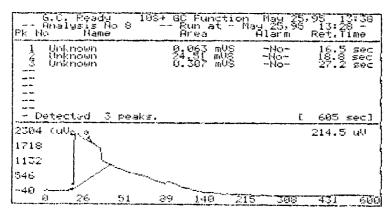
50 ng/l 100 nl



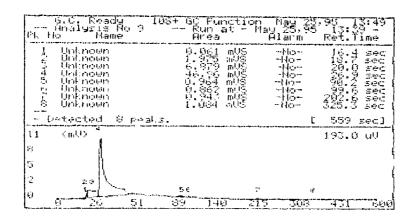
500 eig/l 50 ml

G.C. Flysdy - Analysis No Pt. No Mame	195+ 60 Functi - 7 Run at - Area	on May 25,95 13:27 May 25,95 13:16 7 Alarm Ret.Time
Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown	6.338 mUS 6.896 mUS 183.5 mUS 204.6 mUS 182.1 mUS 48.98 mUS 48.38 mUS 55.21 mUS 75.21 mUS 185.4 mUS 185.4 mUS	-No- 32.3 sec -No- 70.2 sec -No- 145.0 sec -No- 145.6 sec -No- 203.6 sec -No- 326.1 sec -No- 338.0 sec
44 (mV) 33 22 11 0 12 0	51 39 40	203.5 W

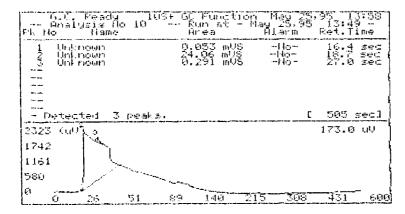




5814-2-5.5 100 ul 13.7 g



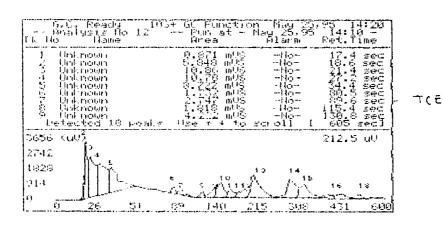
5814-2-5.5 100 ml 13.7g



5B14-2-7:5 100 ul 11.6g

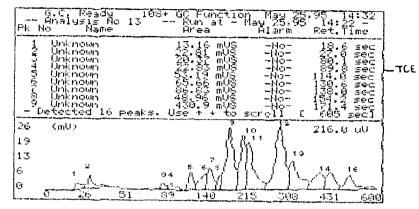
G.C. Ready 1885 - Analysis No 11 Uk No Name	r GC Function - Pun at - I Area	1 May 25. May 25,95 Alarm	95 (3 13:59 Pet.T	ne (ne
1 Untriown 2 Unknown 3 Unknown 4 Unknown 5 Untriown 6 Untriown 7 Unknown	0.060 mUS 1.960 mUS 7.557 mUS 46.574 mUS 0.964 mUS 0.967 mUS	110- 110- 110- 110- 110- 110-	9.000000000000000000000000000000000000	8888888 668888 6000000
- Detected 7 peaks.	**************************************		605 s	sec]
7 5 2 29				
0	s ( ५० विद्यु १९	: , 15308	431	600

5814-1-3.5 100 ul 10.4 z



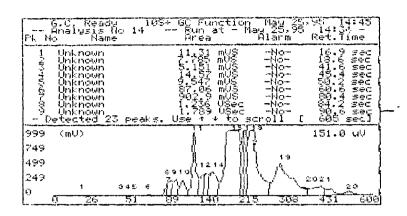
5.C. Ready Analysis No 12 Pk No Name	tus+ GC Function Fun at Brea	1 1194 25. 1au 25.05 14 1arm	95 14:21 14:10 - Pet.Time
10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unlinown 17 Unlinown 17 Unknown 18 Unknown	8.170 mUS 5.775 mUS 7.885 mUS 25.86 mUS 25.86 mUS 26.12 mUS	-110- -110- -110- -110-	138.0 sec 155.0 sec 180.2 sec 198.4 sec 273.6 sec
15 Unknown 16 Unknown 17 Unknown 18 Unknown - Defected 18 pea	8.829 mVs 5.978 mVs	-}}ō- Ho- Ho- Ho- =croll [	307.2 sec 300.3 sec 410.3 sec 470.4 sec 605 sec]

5B14-1-4.0 100 al 13.1



8 Unknown 48.96 mUS -No- 154.2 sec 9 Unknown 458.9 mUS -No- 171.4 sec 18 Unknown 299.9 mUS -No- 197.4 sec 11 Unknown 297.4 mUS -No- 208.6 sec 12 Unknown 724.8 mUS -No- 272.6 sec 13 Unknown 319.7 mUS -No- 365.5 sec 14 Unknown 751.7 mUS -No- 477.5 sec 15 Unknown 258.2 mUS -No- 477.5 sec 15 Unknown 258.2 mUS -No- 488.8 sec	G.C. Ready - Analysis No 13 Fk No Hame	US+ GL Functio Kun at - Area	Nay 25 Nay 25,98 Alarm	,95  4:33   14:22
	9 Unknown 10 Unknown 11 Unknown 12 Unknown 13 Unknown 14 Unknown 15 Unknown 15 Unknown	43997 A M MUSS 43997 A M MUSS 23997 A M MUSS 23997 A M MUSS 23997 A M M MUSS 23997 A M M M M M M M M M M M M M M M M M M	-No- -No- -No- -No- -No- -No-	171,4 sec 197,4 sec 293,6 sec 272,6 sec 273,7 sec 277,7

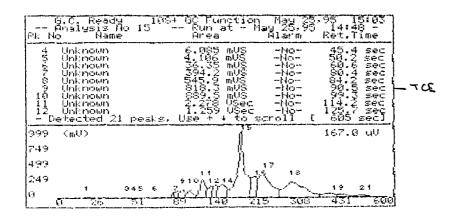
5814-1-6.0 100 ul 14.8g

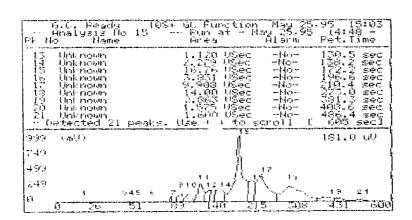


G.C. Res u 1054 Analysis No 14 Pk No - Name	- GC Function Rum at - Ms Area	May 25 14 25,95 Alarm	.95 14:46 14:34 - Set.Time
18 Unknown 11 Unknown 12 Unknown 13 Unknown 13 Unknown 14 Unknown 15 Unknown 16 Unknown 17 Unknown	1.939 USec 6.773 USec 2.763 USec 2.765 USec 2.795 USec 51.500 USec 7.566 USec	-Mo- -Mo- -Mo- -Mo- -Mo- -Mo-	99999999999999999999999999999999999999
18 Unknown - Detected 23 peaks.		roll (	210 6 sec 605 sec!

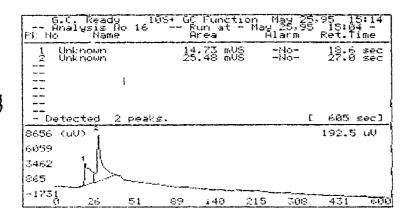
6.6. Ready	188+ GC Function	au 25,95 -	95 14:47
Analysis No	14 Run at - M		14:34 ~
Dr No Name	Area		Ret.Time
15 Unk nown 16 Unk nown 17 Unk nown 18 Unk nown 19 Unk nown 20 Unk nown 20 Unk nown 20 Unk nown 21 Unk nown	61.52 USec 7.306 USec 8.692 USec 85.93 USec 85.13 MUSec 98.13 MUSe 6.102 USec	-No- -No- -No- -No- -No- -No-	173.6 sec 196.3 sec 202.2 sec 210.6 sec 223.8 sec 253.6 sec
The second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th	3.193 USec	-(65-	407.2 sec {
	2.540 USec	-145-	407.2 sec
	waks. Use t + to s	croll [	605 sec] {

50 ul 50 ul 14.8 g





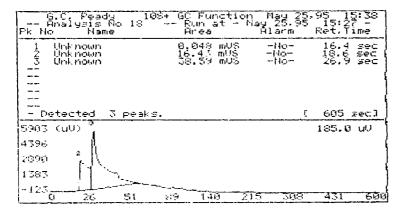
3814-5-3.**g** 100 ul 9.5 g



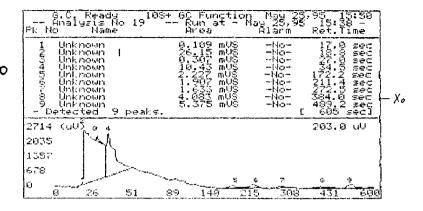
5814-5-5.5 100 ul 12.9 g

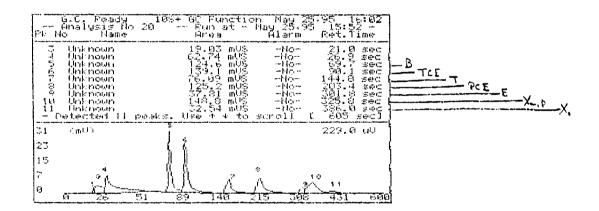
6,C. Ready W Analysis No 17 Pk No Name	93+ OC Punction Run at - h Area	May 25 lay 25,95 Alarm	95 15:26 15:15 - Pet.Time
5 Unknown 4 Unknown 5 Unknown 6 Unknown 7 Unknown 8 Unknown 10 Unknown 11 Unknown 11 Unknown 11 Paak	12,44 mVs 21.16 mVs 21.16 mVs 8.895 mVs 11.56 mVs 11.56 mVs 5.155 mUs 6.165 mVs 6.165 mVs 6.167 mVs 7.177 mVs 8. Use ++ to s	-No- -No- -No- -No- -No- -No- -No- -Ho- -H	44000047951 647-14671-65 647-14671-65 647-14671-65 647-14671-65 647-14671-65 647-14671-65 647-14671-65
2660 (uU ₂ ) 1927 1195 463 -269 0 26 51	89 140 21	<u>*</u> 15 309	910 11

5B14-5-7.5 100 ml 10.6 g



5B14-5-90 100ml 12.8g

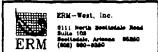




CHAINE	BENZENE	30	TOLUENE	FOE	ETHYLBENZENE	m,p- XYLENE	o-XYLENE	Total
SB14-1-6.0	0.0	1126.5	0.0	0.0	0.0	0.0	848.8	1975.3
SB14-1-4.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	17.8
SB14-1-3.5	0.0	2.7	0.0	0.0	0.0	0.0	0.0	2.7

#### APPENDIX C

BORING AND WELL LOGS



Borehole Number SB4-1

Page 1 of 1

Project Number: 6001.31

Logged By:

S. Becker

Project Name: Reno Air National Guard

Northing:

2291736.00

Location:

Reno, Nevada

Easting:

14850820.00

Contractor:

Layne-Western

05/16/95

Total Depth: 10.00'

Date(s):

17-

18-

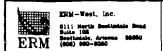
19-

Drilling Method: Hollow-Stem Auger

Borehole Dia.: 8.00in

Water Level: 9.25'

<u>L</u>		Date(:	5):		05/ 1	0/95		Water Level: 9.25
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1 2 3 4 5 6 7 8		ML SM	¥		677988555557777	0 0	0 0.5 1.1	silt, brown, not plastic, trace sand, rootlets, dry to moist  as above, 1/2" well rounded gravel  as above silt, brown, low plasticity, trace clay and fine grain sand, dry to moist  silty sand, brown, fine grain, moist to wet silty sand, gray, fine grain, poorly graded, wet



Borehole Number SB4-2

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Logged By: Northing:

S. Becker

Location:

Reno, Nevada

Easting:

2291709.00

14850856.00

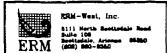
Contractor:

Layne-Western

Total Depth: 8.00'

Drilling Method: Hollow-Stem Auger

	Date(	s):	05/1	7/95		Water Level: N/A
Depth (ft) Graphic Log	USCS Code	Water Level	Sample Recovery Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1 2 - 3 - 4 - 5 - 6 - 17 - 15 - 16 - 17 - 17 - 17 - 17 - 17 - 17 - 17	SM	*	10 25 22 25 13 11 2 3 4	0 0	0.3 0 0.3 0	silty sand, tan to brown, fine to medium grain, well graded, moist silt, brown, low plasticity, 1/2 - 1" gravel, trace sand, some rootlets, moist  as above as above, not plastic silty sand, fine grain, some black organic material, moist clayey, sandy silt, orange to brown, medium plasticity, moist as above, less sand
18-						



Borehole Number SB4-3

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s):

C5/17/95

Logged By:

S. Becker

Northing:

2291683.00

Easting:

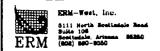
14850885.00

Total Depth: 8.00'

Borehole Dia.: 8.00in

Water Level: 8.00'

L		Date(s	i): 		05/1	1/95		water Level: 0.00
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
		SM	¥-		8 14 17 20 6 9 11 16 10 10	0 0	0 0 0 0	silty sand, tan to brown, fine to medium grain, well graded, loose, moist silt, brown, low plasticity, trace sand, fine grain, moist as above, 1/2 - 1" gravel as above clayey silt, brown, medium plasticity, trace sand, 1/4 -1/2" gravel, moist  as above



Borehole Number SB4-4

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

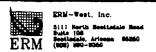
2291649.00

Easting:

14850870.00

Total Depth: 10.00'

	<u> </u>	Date(s	s):		05/1	6/95		Water Level: 9.25'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
		SM		1, 1,	7			silty sand, brown, fine grain, poorly graded, moist
2-		ML			12 21 15 4	0	0	silt, brown, not plastic, 1/2 — 1" gravel, dry to moist as above, tan color, moist
3-		SM			9 10 5 9	0	0	sandy silt, brown, low plasticity, fine grain sand, moist
5- 6-					11 11 3	0	0	as above, less sand, trace organics (black material)
7-		SP			3 5 3 2	0	0	as above
10-		<b>J</b> ,	<u></u>		8 15		0	sand, brown to black, fine grain, poorly sorted, moist
11-								
12-								
13-								
14-		,						
15-								
16-		,					;	
17-								
18-								
19~								



Borehole Number SB4-5

Page 1 of 1

Project Number: 6001.31

Logged By: S. Becker

Project Name: Reno Air National Guard

Northing:

2291646.00

Location:

Reno, Nevada

Easting:

14850796.00

Contractor:

Layne-Western

Total Depth: 10.00'

Drilling Method: Hollow-Stem Auger

	,	Date(	s):	<del>,</del>	05/1	6/95		Water Level: 9.25'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1-		SM ML			4 4 6 21	o	0	silty gravelly sand, medium grain, poorly graded, moist silt, brown, not plastic, stiff, dry
3- 4- 5-		SM			12 12 12 6 9 11 14	130	127 83 61	as above, moderate odor (petroleum—like and solvent—like)  silt, green, low plasticity, moist  silty sand, brown to gray, fine grain, poorly graded, crumbly, moist as above, moderate odor (solvent—like)
7- 8- 9-		SP	<b>Y</b>		3 5 5 6 2 4 10	28	167 103 37	as above sand, brown to black, fine grain, poorly graded, wet
10- 11- 12-			_					as above
13- 14- 15-								
16- 17- 18-								
19-								



Borehole Number SB4-6

Page 1 of 1

Project Number: 6001.31

S. Becker Logged By:

Project Name:

Reno Air National Guard

2291690.00 Northing:

Location:

Reno, Nevada

Easting:

14850800.00

Contractor:

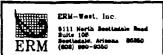
Layne-Western

Total Depth:

12.00'

Drilling Method: Hollow-Stem Auger

		Date(s	s):		05/1	6/95		Water Level:
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1- 2- 3- 4-		SM CL			6 12 19 16	0	0	silty, gravelly, sand, brown, fine to coarse sand, 1/4" gravel, moist to wet  clayey silt, brown, low to medium plasticity  as above
5- 6- 7- 8- 9-		SM			7 6 3 3 8 8 3 4 7 16	0	0	as above, trace fine grain sand, 1/4" gravel clayey, sandy silt, brown, low to medium plasticity, moist silty sand, brown, fine grain, poorly graded, moist sandy silt, brown, not plastic, dry to moist
10-		SP			16 4 12 10 16	1,707	<b>386</b> 0	as above, gray color, moderate odor (petroleum—like)  sand, brown, fine grain, poorly graded, wet  as above
13-								ds dbove
15-								
16-		į						
17-								
19-								



Borehole Number SB4-7

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

or /47 /or

Logged By:

S. Becker

Northing:

2291627.00

Easting:

14850761.00

Total Depth: 10.00'

Date(s):	05/17/95	Water Level: 8.50'
Depth (ft) Graphic Log USCS Code Water Level	Sumple Recovery Blow Counts Field GC (ug/kg)	Description/Soil Classification
ML 1- SM 3- ML 5- ML 5- ML 5- ML 5- ML 5- ML 5- ML 11- 12- 13- ML 15- 16- 17- 18- 19-	7899 4696 3685 3365	silt, brown, trace sand, crumbly, dry as above, rootlets  silty sand, brown, fine grain, moist sandy silt, brown, cohesive, some rootlets, dry to moist sandy silt, fine grain sand, cohesive, brown to orange, some coarse grain sand, moist  silty sand, orange to brown, fine grain, poorly graded, moist sandy silt, brown, low plasticity, moist  silty sand, brown, fine grain, moist to wet silt, brown, cohesive, low plasticity, moist  gravelly sand, brown, loose, fine to coarse grain, wet as above, some 1" gravel



Borehole Number SB5-1

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

2292488.00

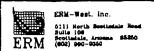
Easting:

14850781.00

Total Depth:

4.00'

			Date(s	s):	,	05/2	1/95		Water Level: 2.25'
	Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
	1- 2- 3- 4- 5- 6- 7-	9	N ML	¥	S	3 2 3 2 2 2	0	0	silt, brown, loose, dry to moist sandy, gravelly silt, fine grain sand, poorly graded, wet as above
	8- 9- 10-								
	11- 12- 13- 14-								
	15- 16- 17-								
1	18- 19-								



Borehole Number SB5-2

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s)

05/21/95

Logged By:

S. Becker

Northing:

2292477.00

Easting:

14851243.00

Total Depth: 8.00'

Borehole Dig.: 8.00in

Water Level: 7.75'

	Date(:	s): 		05/2	1/95		Water Level: 7.75'
Depth (ft) Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PIO (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19-	ML CL SM ML C	<b>Y</b> _		69 128 15 16 16 17 16 16 17 16	685 23 24 1,563	0 88 0 312 27 145	gravelly silty sand, fine grain, poorly graded, 1/8 - 1" gravel (fill?)  as above, moderate odor (petroleum—like) gravelly, clayey silt, tan to brown, low to medium plasticity, 1/8 - 1" gravel, moist  as above, less gravel clay, brown to gray, high plasticity, slight odor (petroleum like), moist clayey silt, orange—brown to gray, low to medium plasticity, moderate odor (petroleum—like) silty sand, brown to gray, fine to coarse grain, well graded, moderate odor (petroleum—like), moist clayey silt, brown, low to medium plasticity, moderate odor (petroleum—like), moist clay, tan to brown, high plasticity, moderate odor (petroleum—like), moist silty sand, tan to gray, fine to medium grain, poorly graded, moist to wet



Borehole Number SB5-3

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

19-

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By: S. Becker

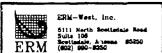
Northing: 2292451.00

Easting:

14851223.00

Total Depth: 8.00'

		Date(	s):	·	05/2	1/95		Water Level: 7.75'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		SM	<b>Y</b>		5 120 330 7 10 13 13 6 120 24 8 15 7 5	0	0 0 0 0	gravelly, silt, tan to brown, cohesive, not plastic, dry to moist as above, rootlets gravelly, sandy silt, brown, loose, 1/8 — 1" gravel, fine grain sand, poorly graded, dry to moist (fill) silt, tan to brown, low plasticity, crumbly, dry to moist clayey silt, brown, stiff, low to medium plasticity silty sand, fine grain, poorly graded, moist to wet



Borehole Number SB5-4

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

19-

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

2292456.00

Easting:

14851200.00

Total Depth: 8.00'

		Date(	s):		05/2	1/95		Water Level: 7.75'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		SM	<b>—</b>		7 8 18 10 7 8 14 14 17 17 6 10 8 7	0	0 0	o-2" asphalt paving silt, brown, low plasticity, rootlets, dry to moist as above, some 1/2" gravel and rootlets  silt, tan, low plasticity, dry to moist as above  as above clayey silt, brown, low to medium plasticity, moist silty sand, fine grain, poorly graded, moist to wet



Borehole Number SB7-1

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stern Auger

Date(s):

05/19/95

Logged By:

S. Becker

Northing:

2291493.00

Easting:

14851785.00

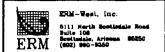
Total Depth:

8.00'

Borehole Dia.: 8.00in

Water Level: 7.75'

Description/Soil Classification    Part   Pa	ı			Date(	٠,٠		00/ .	3/ 33		Water Level. 7.75
SM   18   18   18   18   18   18   18   1		Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
13- 14- 15- 16- 17-		1- 2- 3- 4- 5- 6- 7- 8- 10- 11- 12- 13- 14- 15- 16-		CL ML SM	<b>_</b>		18 18 16 10 5 10 15 17 6 8 8	730 7,143	0 162 693	gravelly, silty sand, tan to brown, fine grain, poorly graded, moist silt, brown to gray, medium plasticity, moist as above, low plasticity, rootlets as above, trace sand, moderate odor (petroleum—like) silty sand, gray to brown, low plasticity, moderate odor (petroleum—like), moist as above, moderate to strong odor (petroleum—like) silt, brown to gray, medium plasticity, moist sand, gray to black, poorly graded, wet strong odor
		f								



Borehole Number SB7-2

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s):

05/19/95

Logged By:

S. Becker

Northing:

2291461.00

Easting:

14851806.00

Total Depth: 10.00'

Borehole Dia.: 8.00in

Water Level: 8.00'

Dutch.		00/10/00	Hater Later: 0.00
Depth (ft) Graphic Log USCS Code	Water Level Sample Recovery	Blow Counts Field GC (ug/kg)	Description/Soil Classification
1- SM SM SM SM SM SM SM SM SM SM SM SM SM		22 12 11 13 0 4 8 12 12 12 4,285 6 10 25 21 17,314 2 8 14 13 4,829 4 10 18 16	silt, brown to gray, trace clay, moderate odor (petroleum like), moist  silty sand, fine grain, poorly graded, moist  silty sand, fine grain, poorly graded, moist



Borehole Number SB7-3

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

DE /40 /DE

Logged By:

S. Becker

Northing:

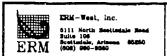
2291412.00

Easting:

14851802.00

Total Depth: 8.00'

		Date(s	3):		05/1	9/95		Water Level: 7.75'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1-		SM CL			4 6 5 6	176	6	0-2" asphalt paving gravelly, silty sand, brown, 1/8 — 1" gravel, fine sand, moist clayey silt, gray to brown, low to medium plasticity, moist silty clay, gray to black, medium to high plasticity, moderate odor (petroleum—like), moist
		;			16 8 10	10,223	264	as above, low to medium plasticity
5- 6-					10 18 17 3	25,592	215	as above, some sand silty clay, gray to black, medium to high plasticity, moist
8-		SM	Ā		10 8	15,181	80	as above silty sand, fine grain, poorly graded, wet
9-								
10-								
11-								
12-								
13-								
14-			1					
15-						:		
16-							į	
17-		:						
18-		:						
19-								



Borehole Number SB7-4

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Date(s):

Layne-Western

Drilling Method: Hollow-Stem Auger

05/19/95

Logged By:

S. Becker

Northing:

2291305.00

Easting:

14851808.00

Total Depth: 8.00'

Borehole Dia.: 8.00in

Water Level: 7.75'

		Dutci.	<del>-/·</del>		00/ 1	<del></del>		maler Level: 7.75
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6-	Graphi	SOSU ₹ PSCS	.i. ₩ater		NOIB 77 14 455 231210	Field (09/k)	d) (III	gravelly, sandy silt, brown, low plasticity, moist silt, brown, low plasticity, dry to moist silty clay, tan to brown, moist, low to medium plasticity  as above, brown color, low plasticity clay, brown, high plasticity, moist as above, medium to high plasticity silty sand, gray to black, fine grain, poorly graded, wet



Borehole Number SB7-5

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s):

16-

17-

18-

19-

05/20/95

Logged By:

S. Becker

Northing:

2291301.00

Easting:

14851798.00

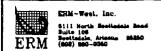
Total Depth:

8.00'

Borehole Dia.: 8.00in

Water Level: 7.50'

			Datel	<u> </u>		03/2	0/33		wdter Level: 7.50
	Depth (ft)	Graphic Log	uscs code	Water Level	Sample Recovery	89	Field GC (ug/kg)	PiD (ppm)	Description/Soil Classification
	1- 2- 3- 4- 5- 6- 7- 8- 10- 11-		SP	<b>=</b>			0 266 16,390 5430	137 363 6 400 567 763	gravelly sand, fine to medium grain, well graded, rock fragments, moist as above, brown color clayey silt, brown to gray, medium plasticity, slight odor (petroleum—like), moist silty clay, gray to black, medium plasticity, moderate odor (petroleum—like), moist as above, trace 1/2" gravel and sand sandy clay, gray to black, low plasticity, moist silty clay, gray to black, medium to high plasticity, moist sand, gray to black, fine grain, poorly graded, wet
	12-								
	13-								
I	14-								
	15-								



Berehole Number SB7-6

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

2291329.00

Easting:

14851581.00

Total Depth: 8.00'

Borehole Dia.: 8.00in

	Date(s	s):	05,	/20/95		Water Level: 8.00'
Depth (ft)		Water Level	Sample Recovery Blow Counts	Field GC (ug/kg)	PiO (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 10- 11- 12- 13- 14- 15- 16- 17- 18-	SOSO ME	□   Water	Sombly 10 (20 18 6 4 8 16 23 10 12 15 15 8 11 8 9	o 72 67	a) Old 2 15 13 0 0	gravelly silt, brown, low plasticity, 1/4 — 1.5" gravel (fill) as above clayey silt, gray to brown, low plasticity, moist  silt, orange to brown, not plastic, trace sand, moist  clayey silt, gray, low plasticity, moist  silty clay, gray, medium plasticity, trace gravel, moist as above, wet
19-						

ERM-West, Inc. Bulla 108
ERM (608) 300-8080

## BOREHOLE LOG

Borehole Number SB7-7

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

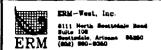
2291448.00

Easting:

14851574.00

Total Depth: 8.00'

	<del>,</del>	Date(	s):		05/2	0/95		Water Level: 8.00'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PiO (ppm)	Description/Soil Classification
1- 2- 3-		SM ML			10 26 18 20 8 10	106,415	-	silty, sandy gravel, brown, fine grain, gravel 1/2 — 1" diameter, loose, moist silt, gray, low plasticity, moist as above (based on cuttings)
4-		CL			15 4 8 10	825	463	silty clay, gray, medium plasticity, moist (GC sample only) gravelly clay, tan to gray, 1/4 — 1" gravel, medium to high
6-					10 15 3 5	20,578	10.1 40	plasticity, moist silty clay, tan to gray, low to medium plasticity, moderate odor (petroleum—like), moist
8-		SM	<u></u>		5 8 15	121,683	<b>832</b> 18	silty sand, gray, fine grain, poorly graded, moist as above, wet
9-								
11-								
12-								
13-								
15-					ļ			
16-		ľ						
17-								
18-								
19-								



Borehole Number SB7-8

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

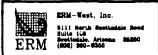
2291485.00

Easting:

14851714.00

Total Depth: 8.00'

	(	Date(s	):		05/2	0/95		Water Level: 7.50'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7-		GM ML	<b>Y</b>		4 7 10 12 13 10 13 13	9,624 1,876 504	620 150 30	0-2" asphalt paving silty gravel, 1/8 - 3" gravel (fill) clayey silt, tan to gray, low plasticity, crumbly, dry to moist  as above, moist  silty clay, brown to gray, medium to high plasticity, moist  silty sand, gray to black



Borehole Number SB7-9

Page 1 of 1

Project Number: 6001.31

Logged By:

S. Becker

Project Name: Reno Air National Guard

Northing:

2291408.00

Location:

Reno, Nevada

Easting:

14851831.00

Contractor:

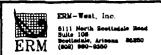
i.ayne-Western

Total Depth:

10.00'

Drilling Method: Hollow-Stem Auger

			Date(s	s):		05/2	3/95		Water Level: 8.25'
	Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PiD (ppm)	Description/Soil Classification
	1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		SSN ML CL SC SP	.ı ★		NOTO 7976 6336 36711 3988	Plaid 881 620 1.2 0 24	0 1 0	0-2" asphalt paving, silt, brown, some 1/2 - 1 " gravel, some sand, low plasticity, moist clayer silt, tan to brown, medium plasticity, moist as above, trace clay, medium plasticity clayer silt, tan to brown, some sand, low to rnedium plasticity, moist as above, medium plasticity silty, clayer sand, fine grain, poorly graded, wet
1	19-	ļ							



Borehole Number SB7-10 Page 1 of 1

Project Number: 6001.31

Logged By:

S. Becker

Project Name: Reno Air National Guard

Northing:

2291304.00

Location:

Reno, Nevada

Easting:

14851724.00

Contractor:

Layne-Western

Total Depth: 8.00'

Drilling Method: Hollow-Stem Auger

1	Deta(a): 05 /23 /05							Solution Sign Stoom
	Date(s): 05/23/95							Water Level: 7.25'
Depth (ft)	Graphic Log USCS Code Water Level Sample Recovery Blow Counts Field GC (ug/kg)		PID (ppm)	Description/Soil Classification				
1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-		SOSO M C	□   Moter		12 34 5 10 14 13 5 6 12 20 40	plaid (graph of the plant) of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of the plant of t	0 9 63 72 30 21	sandy silty gravel, 1/8 — 1" gravel, well graded, moist to wet  silty clay, some gravel, low to medium plasticity  as above, moderate odor (petroleum—like) silty clay, tan to brown, medium plasticity, moderate odor (petroleum—like)  as above as above, medium to high plasticity sand, gray to black, fine grain, poorly graded, wet
18-								



Borehole Number SB7-11

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

19-

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

2291304.00

Easting:

14851643.00

Total Depth: 8.00'

		Date(:	s):		05/2	3/95		Water Level: 6.75'
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7-		GM CL ML CL	*		13 25 20 25 4 8 12 20 3 7 14	4,200 5,819 30,866 23,408	380 407 1451 170 1741 1730 700 485	silty, sandy gravel, poorly graded, moist silty clay, tan to gray, low plasticity, moderate ador (petroleum—like), moist silt, trace clay, crurnbly, moist as above, strong odor (petroleum—like) clayey silt, tan to gray, low to medium plasticity, strong odor (petroleum—like), moist silty clay, tan to gray, medium plasticity, moist sand, gray to black, fine grain, poorly graded, wet
9-								
11-								
12-								
13-								
14-		,						
15-								
17-								
18-								



Borehole Number SB7-12

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s)

05/22/95

Logged By:

S. Becker

Northing:

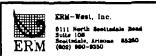
2291450.00

Easting:

14851547.00

Total Depth: 8.00'

	Date(	s):	<del></del>	05/2	2/95		Water Level: 7.75'
Depth (ft) Graphic Loa		Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1 2 3 4 4 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6	GP ML CL			3 7 7 10 3 4 7 8	0	0	cobbles, 0-2" diameter silt, tan to brown, trace clay, low plasticity, moist silty clay, tan to brown, medium plasticity, moist as above, low to medium plasticity
6-7-8-	SM	<u>_</u>	4	3 10 9 12	0	0	as above silty sand, gray to black, fine grain, poorly graded, wet
9-							
12-							
15-							
17- 18- 19-							



Borehole Number SB14~1 Page 1 of 1

Project Number: 6001.31

Logged By:

S. Becker

Project Name: Reno Air National Guard

Northing:

2292424.00

Location:

Reno, Nevada

Easting:

14851723.00

Contractor:

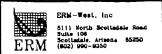
Layne-Western

Total Depth:

8.00' Borehole Dia.: 8.00in

Drilling Method: Hollow-Stem Auger

	,	Date(s	s):		05/2	4/95		Water Level: 6.25'			
Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification			
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		SM			45444	2.7 18	0 30	silty sand, orange to brown, fine grain, poorly graded, moist  clayey silt, brown, low plasticity, moist  silty clay, brown, high plasticity, moist  as above, medium to high plasticity, slight odor (petroleum like)  as above, based on cuttings  silty sand, gray to black, fine grain, poorly graded, wet  as above, less silt			



Borehole Number SB14-2

Page 1 of 1

Project Number:

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s):

05/24/95 - 05/24/95

Logged By:

S. Becker

Northing:

2292396.00

Easting:

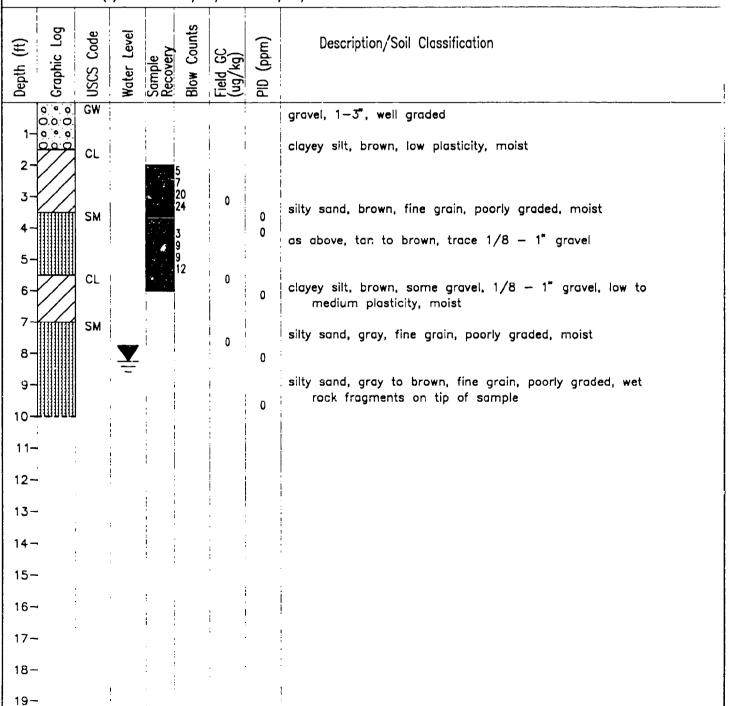
14851745.00

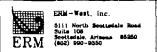
Total Depth:

10.00'

Borehole Dia.: 8.00in

Water Level: 8.25'





Borehole Number SB14-3

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Date(s)

05/24/95

Logged By:

S. Becker

Northing:

2292377.00

Easting:

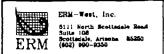
14851730.00

Total Depth: 10.00

Borehole Dia.: 8.00in

Water Level: 8.25"

Į			Date(s	s): 		05/2	4/95		Water Level: 8.25'
	Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PiO (ppm)	Description/Soil Classification
	1 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 15 - 16 - 17 - 18 - 19 - 19 - 19 - 19 - 19 - 19 - 19		SM	<b>▼</b>		6 12 18 14 4 4 10 10	682	0 700 60 29	gravelly, silty sand, brown, fine grain, poorly graded, moist silty clay, brown, medium plasticity, moist clayey silt, brown, low plasticity moist as above, low to medium plasticity silty sand, tan, fine grain, poorly graded, moist as above, color change to gray, moderate odor (petroleum—like) as above, color change to gray to black as above, mild odor (petroleum—like) as above, wet



Borehole Number SB14-4

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Data(e)

05/24/05

Logged By:

S. Becker

Northing:

2292408.00

Easting:

14851721.00

Total Depth: 1.50'

Borehole Dig.: 8.00in

Water Level

	Date	(s):		05/2	4/95		Water Level:
Depth (ft)	Graphic Log USCS Code		Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1-	SM						gravelly, silty sand, 1/8 — 1" gravel, fine grain, poorly graded, moist concrete vault encountered at 1.5', terminate boring
3- 4- 5-	!	!					
6							
10-							
13-		:					
15- 16- 17- 18-	:	:					
19-							



Borehole Number SB14-5

Page 1 of 1

Project Number: 6001.31

Project Name: Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Northing:

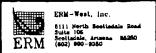
2292360.00

Easting:

14851730.00

Total Depth: 10.00'

	Date(	s):	0	5/25	6/95		Water Level: 9.25'
Depth (ft)	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	Pi0 (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19-	SP SM ML CL SP	<b>—</b>	7 7 7 7 20 25 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 7 1	0   0   0   0   0   0   0   0   0   0	0 1.5 0.5	0-2" asphalt paving gravelly sand, fine grain, poorly graded, dry to moist gravelly silt, 1/8 - 1" gravel, well graded, moist silt, gray to tan, crumbly, dry to moist as above, low plasticity silty sand, gray, fine grain, poorly graded, moist clayey silt, tan to brown, low to medium plasticity, moist as above sand, gray to black, poorly graded, wet



Borehole Number S87T-1

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stern Auger

Logged By:

S. Becker

Date(s):

18-

19

05/18/95 - 05/23/95

Total Depth:

11.00'

Completed Depth: 11.00'

Northing:

2291425.00

Easting:

14851721.00

Borehole Dia.: 8.00in

Well Construction

Blank C type: PV

dia: 2.00in fm: .1'

to: 3.00'

Screens:

type: Slotted

size: .010india: 2.00in fm: 3.00'

to: 10.50'

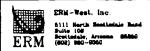
Annular Fill:

type: Grout type: Bentonite type: Sand Filter

fm: .20' fm: .50' fm: 2.00'

to: .50' to: 2.00' to: 11.00'

	<del>conspecto</del>							type. Salid Filter 1811. 2.00 to, 11.00
Depth (ft)	Graphic Log	USCS Code	Woier Level	Well Construction  MP. EL 4399.50	Sample Recovery	Blow Counts	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17-		SM SP	Ā				10 265 130 381	o-2" asphalt paving gravelly, silty sand, brown to gray, fine to medium grain, moderate odor (petroleum-like), moist to wet  as above sand, gray to black, poorly graded, moderate to strong odor (petroleum-like), wet  as above, fluid that appears to be free product appears on sail cuttings  gravel, poorly graded, moist to wet, very difficult drilling at 11'



Borehole Number 5871-2

Page 1 of 1

Project Number: 6001.31

Reno Air National Guard Project Name:

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stern Auger

Logged By:

S. Becker

14.00

Date(3):

15-

16-

17-

18-

19-

05/18/95 - 05/23/95

Total Depth:

Completed Depth: 13 00'

Northing:

2291425.00

Easting:

14851743.00

Borehole Dia.: 8.00in

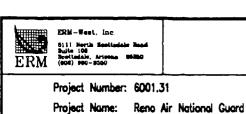
Well Construction Blank Sasing: type: PVC dia: 2.00in fm: .1' to: 3.00' Screens: type: Slotted size: .010india: 2.00in fm: 3.00* to: 12.50'

Annular Fill: type: Grout type: Bentonite

fm: .20' fm: .50' fm: 2.00'

to: .50° to: 2.00°

Complete	d Dep	th: 13.00	)' 				type: Sand Filter fm: 2.00' to: 14.00'
Depth (ft) Graphic Log	USCS Code	Water Level	Well Construction MP. EL 4399.29	Sample Recovery	Blow Counts	PiD (ppm)	D <del>esc</del> ription/Soil Classification
1-1 2-3 3-4-5 6-7 8-9-1 10-1 11-1 12-1 13-1 14	SM CL SM	Ā				0 71 85	0-2" asphalt paving gravelly, silty sand, fine grain, 1/8 - 1" gravel, poorly graded, dry to moist gravelly silt, brown to gray, low plasticity, moderate odor (petroleum-like), moist clayey silt, brown to gray, trace gravel, low to medium plasticity, moderate odor (petroleum-like), moist to wet as above, no gravel silty sand, gray, poorly graded, moderate odor (petroleum-like), wet as above



Location:

### BOREHOLE LOG

Borehole Number SB7T-3

to: 4.00'

Page 1 of 1 2291383.00

Northing:

14851720.00

Easting:

Borehole Dia.: 15.00in

Contractor:	Lavne-Western		Well Construction
		Blank Casine type: PVC	g:
Drilling Method:	Hollow-Stem Auger	type: PVC	dia: 6.00in fm: .1'
Logged By:	S. Becker	Screens: type: Slotted	size: .010india: 6.00in fm: 4.00'
Date(s):	05/23/95	AI Cill	326010mag. 0.00m mi. 4.00

Total Depth: 15.50 Completed Depth: 14.50'

Reno, Nevada

to: 14.00' Annular Fill: type: Grout type: Bentonite type: Sand Filter to: 1.50' to: 3.00' to: 15.50' fm: .20' fm: 1.50' fm: 3.00'

		<u></u>						W. 0100
Depth (ft)	Graphic Log	USCS Code	Water Level	Well Construction MP. EL. 4399.00	Sample Recovery	Blow Counts	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6- 7- 8-		SM	Ā				691	gravelly, silty sand, fine grain, poorly graded, moderate odor (petroleum-like), moist  as above, strong odor (petroleum-like)
9- 10- 11- 12- 13-			_				2135	as above, appearance of fluid that appears to be free product on soil, wet silty sand, gray to black, fine grain, poorly graded, wet
14- 15- 16- 17- 18- 19-							1200	as above

ERM

#### BOREHOLE LOG

Borehole Number SB7T-4

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno. Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Date(s):

Total Depth:

Completed Depth: 18.00'

Northing:

2291304.00

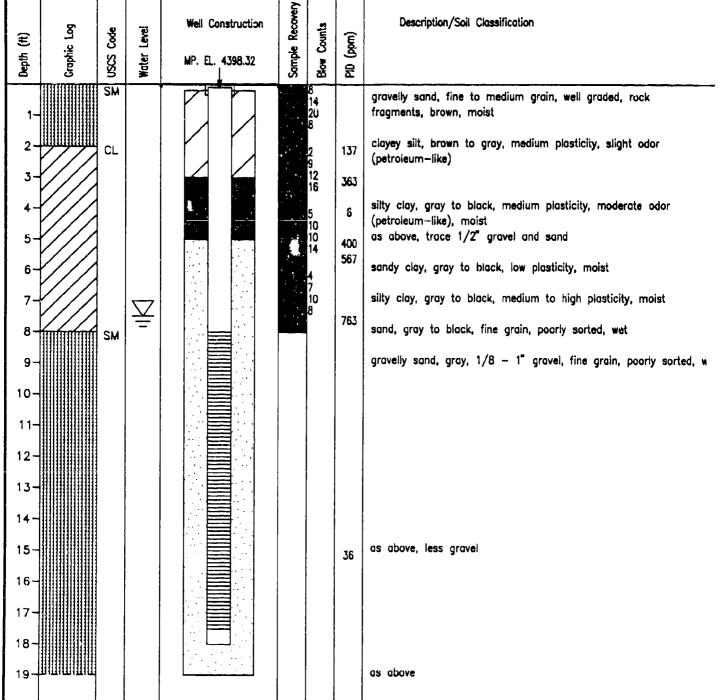
Easting:

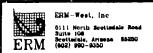
14851685.00

Borehole Dia.: 8.00in

	Well Construction	
Blank Casing: type: PVC	dia: 2.00in fm: .1'	to: 8.00'
Screens: type: Slotted	size: 010india: 2.00in fm: 8.00'	to: 17.50'

05/24/95 Annular Fill: to: 3.00' to: 5.00' to: 19.00' frn: .20' fm: 3.00' 19.001 type: Grout type: Bentonite type: Sand Filter fm: 5.00'





Borehole Number MW-28

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stern Auger

Logged By:

S. Becker

Date(s):

05/18/95

Total Depth:

18.50'

Completed Depth: 18.00'

Northing:

2291746.00

Easting:

14850936.00

	Well Co	nstruction	
Blank Casing: type: PVC	dia: 2.00in	fm: .1'	to: 8.00°
Screens: type: Slotted size:	.010india: 2.00in	fm: 8.00*	to: 17.50'
Annular Fill: type: Grout type: Bentonite type: Sand Filter		fm: .20' fm: 2.00' fm: 5.00'	to: 2.00' to: 5.00' to: 18.50'

								type. Selle Titter
Depth (ft)	Graphic Log	USCS Code	Water Level	Well Construction MP. EL 4404.03	Sample Recovery	Blow Counts	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6-		CL				18 23 14 8	0	silt, brown, cohesive, some sand and gravel, sand fine grain, gravel 1/2°, dry to moist  silty clay, orange to brown, low to medium plasticity, some organic material, moist
7- 8- 9- 10- 11- 12-		sw	幸			6 14 25 23	٥	as above sand, gray to black, fine to coarse, well graded, wet
14- 15- 16-						18		as above, 1/2 - 3/4" gravel
17- 18- 19-							0	as above



Borehole Number MW-29

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Date(s):

05/18/95

Total Depth:

18.50'

Completed Depth: 18,00°

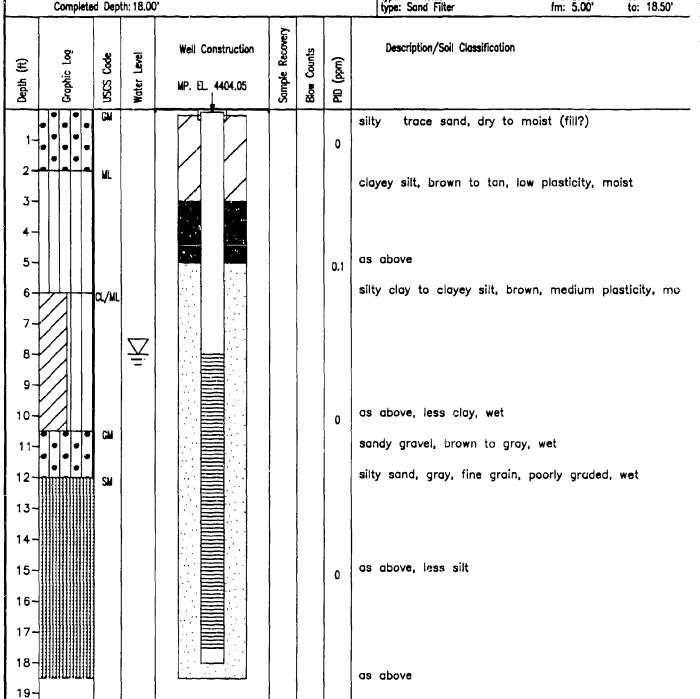
Northing:

2291701.00

Easting:

14850936.00

	I Construction	
Blank Casing: type: PVC dia:	2.00in fm: .1'	to: 8.00'
Screens: type: Slotted size: .010india:	2.00in fm: 8.00*	to: 17.50'
Annular Fill: type: Grout type: Bentonite	fm: .20' fm: 3.00'	to: 3.00' to: 5.00'



ERM-West, inc 5111 North Scottsdale Read Suits 108 Scottsdale, Arisons 05250 (ecc) 990-9350

### BOREHOLE LOG

Borehole Number MW-30

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Loyne-Western

Drilling Method: Hollow-Stem Auger

Logged By:

S. Becker

Date(s):

05/22/95

Total Depth:

19.00'

Completed Depth: 18.00'

Northing:

2292462.00

Easting:

14851331.00

Borehole Dia.: 8.00in

Well Construction

dia: 2.00in fm: .1'

Blank Casing: type: PVC

Screens: type: Slotted size: .010india: 2.00in fm: 8.00' to: 8.00'

to: 17.50'

Annular Fill: type: Grout type: Bentonite type: Sand Filter

fm: .20' fm: 3.00' fm: 5.00'

to: 3.00' to: 5.00' to: 19.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Well Construction  MP. EL 4404.48	Sample Recovery	Blow Counts	PiD (ppm)	Description/Soil Classification
1- 2- 3- 4- 5- 6-		SM					0	0-2" asphalt paving gravelly, silty sand, tan, fine grain, poorly graded, dry to moist  gravelly sandy silt, brown, low plasticity, moist
8- 9- 10- 11- 12- 13-		SM	₩.				0	silty sand, tan to brown, fine grain, poorly graded, moist to wet
15- 16- 17- 18- 19-							0	as above small rock at 16' silty sand, tan to brown, fine grain, poorly graded, wet

ERM-West, Inc

5111 North Scattsdals Read
Suits 108
Scottsdals, Amena 85250
(602) 980-8350

#### BOREHOLE LOG

Borehole Number

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno. Nevada

Contractor:

101101 1101000

Drilling Method: Hollow-Stem Auger

Loyne-Western

Logged By:

S. Becker

Date(s):

05/20/95

Total Depth:

19.00'

Completed Depth: 18.00'

Northing:

2291329.00

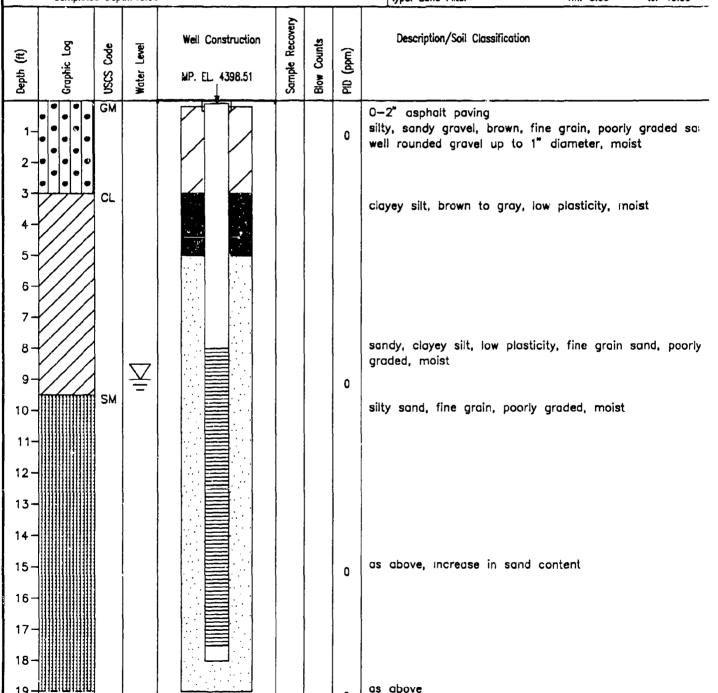
Well Construction

Easting:

14851821.00

Borehole Dia.: 8.00in

Blank Casing: type: PVC dia: 2.00in	fm: .1'	to: 8.00*
Screens: type: Slotted size: .010india: 2.00in	fm: 8.00'	to: 17.50'
Annular Fill: type: Grout type: Bentonite type: Sand Filter	fm: .20' fm: 3.00' fm: 5.00'	to: 3.00' to: 5.00' to: 19.00'



0

ERM

ERM-West, Inc 5111 North Scottsdale Road Suite 108 Scottsdale, Armona 85250 (802) 890-8350

### BOREHOLE LOG

Borehole Number MW-32

Page 1 of 1

Project Number: 6001.31

Project Name:

Reno Air National Guard

Location:

Reno, Nevada

Contractor:

Layne-Western

Drilling Method:

Hollow-Stem Auger

Logged By:

S. Becker

Date(s):

05/21/95

Total Depth:

19.00'

Completed Depth: 18.00'

Northing:

2292544.00

Easting:

14851155.00

Borehole Dia.: 8.00in

Well Construction

Blank Casing: type: PVC

dia: 2.00in fm: .1'

to: 8.00'

Screens: type: Slotted

size: .010india: 2.00in fm: 8.00'

to: 17.50'

Annular Fill: type: Grout type: Bentonite type: Sand Filter

fm: .20' fm: 3.00' fm: 5.00'

to: 3.00' to: 5.00' to: 19.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Well Construction MP. EL. 4401.89	Sample Recovery	Blow Counts	PiD (ppm)	Description/Soil Classification
1-		CL					0	silty clay, tan, low to medium plasticity, moist
3- 4-								
5-		ML					0	sandy silt, tan, low plasticity, fine grain sand, moist
6 <b>~</b> 7-								rocks at 7'
8~			至					
9- 10-							0	as above
11-		SM						silty sand, gray to brown, fine grain, poorly graded, wet
12- 13-								
14-								
15-								
16-								
17- 18-								as above
							O	

#### APPENDIX D

LOCATION AND ELEVATION SURVEY



#### LETTER OF TRANSMITTAL

330 Crampton St., Heno, NV 89502	<u> </u>
(702) 329-2540 • Fax (702) 329-27	
	ATTENLON RObin Weesner
ERM West	Nevada Air Guard Moniter Well Survey
5111 N. Scottsdale Rd., Ste. 108	
Scottsdalla AZ 85250	
GENTLEMEN:	
WE ARE SENDING YOU XX Attached	☐ Under separate cover viathe following items:
☐ Shop drawings ☐ Prints	☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change ord	der 🗆
OPIES DATE NO.	DESCRIPTION
1 Printout of	coordinate values
1 Reduced plo	t of well locations
1 Tabulation	of well elevations
	eld notes RECEIVED
DXF file of	drawing JUL 0 3 1995
	JOE 0.2 1222
	ERM-WEST INC. PHOENIX, AZ.
THESE ARE TRANSMITTED as checked below:	
	David as submitted
	oved as submitted
	oved as noted
	Thed for corrections     Return corrected prints
C FOR BIDS DUE	19 PRINTS RETURNED AFTER LOAN TO US
	PRINTS RETURNED AFTER LUAN TO US
REMARKS	
COPY TO File	$\sim$ $\sim$ $\sim$ $\sim$ $\sim$ $\sim$ $\sim$

SIGNED: Michael J. Miller

Point	Northing	Easting	Elevation Note
====== 1	5000.000000	5000.000000	C.000 SPIKE AT POB
2	5000.000000	4118.540000	0.000 SPIKE AT INTX
3	6059.347162	5085.413970	0.000 SPIKE WK PT
<del>-50</del>	<del>~~5019.906983</del>	<del>-4745.718145</del> -	
51	4994.905367	4848.529548	-1.087 -4
52	4995.766980	4807.288608	-0.906 SB 7- 1
53	4992.279636	4962.370794	-1.900 B 7-10
54	4996.155569	4972.393001	-1.613 B 7-4
55	5019.536072	4984.911395	-0.875 MW 31
56	5099.983021	4995.595794	-0.070 SB 7-9
57	5149.838954	4972.739629	-0.671 MW 06
58	5152.858674	4969.979535	-0.638 SB 7-2
59	5184.378618	4949.309826	-0.347 SB 7-1
60	5103.032604	4966.260161	-0.896 SB 7-3
61	5064.811470	4957.931039	-1.369 MW 7
62	5073.946910	4884.267391	-0.306 -3
63	5115.597734	4885.072838	-4.181 -3
64	5115.839758	4907.415945	-4.476 T-2
65	5176.139057	4878.842369	-3.855 SB 7-8
66	5038.785652	4749.660626	-4.144 TEMP WK PT
67	4995.392750	4888.257044	-10.735 SB 7-10
68	4995.126791	4713.851973	-5.423 RED 6-OR-9 GRAY - SB 7-6
69	5139.685502	4738.456807	-4.073 SB 7-7
70	5141.360638	4711.586904	-5.369 SB 7-12
71	4999.952354	4118.508122	0.049 COORDINATE CHECK
72	5266.367922	4100.770036	0.000 SPIKE WK PT
73	6109.854435	4123.382684	0.000 P-K IN AC
74	5391.632537	4099.688004	-4.210 MW29
75	5436.169834	4099.430901	-4.236 MW28
76	5380.565569	3964.417470	-3.910 SB4-6
77	5400.093942	4020.091029	-4.381 SB4-2
78	5426.579370	3983.916061	-0.576 SB4-1
79	5374.151493	4049.682390	-0.688 SB4-3
80	5340.158328	4033.993414	-0.299 SB4-4
81	5336.790111	3960.629821	-0.471 SB4-5
82	5318.199378	3925.722460	0.014 SB4-7
83	6142.434941	4386.444901	3.844 SB5-3
84	6146.879686	4363.616845	-4.902 SB5-4
85	6168.349402	4406.454644	2.069 SB5-2
86	6234.295523	4318.149512	-7.229 MW 32
87	6153.133929	4493.911466	-0.558 MW30
88	6051.908057	4894.185514	-5.062 SB14-5
89	6068.666463	4893.436365	-4.655 SB14-3
90	6087.844830	4908.840344	-4.692 SB14-2
91	6115.824383	4886.288381	-0.210 SB14-1
92	6099.154541	4884.907765	0.412 SB14-4
93	6099.033602	4902.136554	-0.681 MW 15

ERN W. 4.

DB: Name AIRGUARD, Daie 5-30-1995, Time 08:55:54.24 Mode Setup: North Azimuth, Dist feet, Scale 1.0000, Earth crv ON, Angle Deg Store: Pt 1,N 5000.0000,E 5000.0000,Elv 100.0000,START tore: Pt 2,N 5000.0000,E 4118.5400,Ely 0.0000,SPIKE AT INTX tore: Pt 1,N 5000.0000,E 5000.0000,Elv 0.0000,SPIKE AT POB Store: Pt 150,N -99999.9900,E -99999.9900,Elv -99999.9900, "I / HR : Inst H 0.0000, Rod H 0.0000 ote: BS point check:1-2, Horiz err: -0.016, Vert err: 5.230 Jacupy: Occ 1,N 5000.0000,E 5000.0000,ELV 0.0000,SPIKE AT POB Backsight: Occ 1,BS Pt 2,BS azm 270.0000,Back circle 0.0000 ide Shot: 1-50,Ang-Rt 4.2835,Zenith 90.0310,Slp Dst 255.0600,S B 7-6 ide Shot: 1-51,Ang-Rt 358.0425,Zenith 90.2440,Slp Dst 151.5600,-4 Side Shot: 1-52,Ang-Rt 358.4430,Zenith 90.1610,Slp Dst 192.7600,SB 7-11 Side Shot: 1-53, Ang-Rt 348.2420, Zenith 92.4955, Slp Dst 38.4600, B 7-10 ide Shot: 1-54, Ang-Rt 352.0420, Zenith 93.1840, Slp Dst 27.9200, B 7-4 ide Shot: 1-55,Ang-Rt 52.1910,Zenith 92.0150,Slp Dst 24.7000,MW 31 Side Shot: 1-56, Ang-Rt 87.2840, Zenith 90.0225, Slp Dst 100.0800, SB 7-9 Side Shot: 1-57,Ang-Rt 79.4120,Zenith 90.1510,Slp Dst 152.3000,MW 06 ide Shot: 1-58, Ang-Rt 78.5320, Zenith 90.1405, Slp Dst 155.7800, SB 7-2 ide Shot: 1-59, Ang-Rt 74.3740, Zenith 90.0615, Slp Dst 191.2200, SB 7-1 Side Shot: 1-60, Ang-Rt 71.5205, Zenith 90.2825, Slp Dst 108.4200, SB 7-3 ide Shot: 1-61,Ang-Rt 57.0045,Zenith 91.0055,Slp Dst 77.2800,MW 7 ide Shot: 1-62,Ang-Rt 32.3435,Zenith 90.0740,Slp Dst 137.3400,-3 side Shot: 1-63,Ang-Rt 45.1000,Zenith 91.2810,Slp Dst 163.0600,-3 Note: LAST SHOT T-1 ide Shot: 1-64, Ang-Rt 51.2200, Zenith 91.4345, Slp Dst 148.3600, T-2 ide Shot: 1-65,Ang-Rt 55.2840,Zenith 91.0200,Slp Dst 213.8200,SB 7-8 Traverse: 1-66, Ang-Rt 8.4825, Zenith 90.5615, Slp Dst 253.3600, TEMP WK PT Note: BS point check:66-1, Horiz err: -0.018, Vert err: -10.161 troupy: Occ 66,N 5038.7857,E 4749.6606,ELV -4.1440,TEMP WK PT acksight: Occ 66,8S Pt 1,8S azm 98.4825,Back circle 0.0000 Side Shot: 66-67, Ang-Rt 8.3440, Zenith 92.3555, Slp Dst 145.3800, SB 7-10 ide Shot: 66-68,Ang-Rt 120.3305,Zenith 91.1750,Slp Dst 56.4800,RED 6 OR 9 GRA ide Shot: 66-69, Ang-Rt 254.5125, Zenith 89.5735, Slp Dst 101.5200, SB 7-7 Jide Shot: 66-70, Ang-Rt 240.4945, Zenith 90.3830, Slp Dst 109.4200, SB 7-12 Side Shot: 66-71, Ang-Rt 167.4020, Zenith 89.3715, Slp Dst 632.3600, COORDINATE CH ote: 8S point check:2-1, Horiz err: 0.001, Vert err: -5.817 tore: Pt 72,N 5266.3679,E 4100.7700,ELV 0.0000,SPIKE WK PT Store: Pt 73,N 6109.8544,E 4123.3827,Elv 0.0000,P-K IN AC Note: BS point check:72-73, Noriz err: 0.010, Vert err: 0.956 ccupy: Occ 72,N 5266.3679,E 4100.7700,Elv 0.0000,SPIKE WK PT acksight: Occ 72,85 Pt 73,85 azm 1.3208,Back circle 0.0000 Side Shot: 72-74,Ang-Rt 357.5810,Zenith 91.5530,Slp Dst 125.3400,MW29 Side Shot: 72-75, Ang-Rt 358.0045, Zenith 91.2545, Slp Dst 169.8600, MW28 ide Shot: 72-76, Ang-Rt 308.2440, Zenith 91.1535, Slp Dst 177.9000, S84-6 ide Shot: 72-77,Ang-Rt 327.2140,Zenith 91.3625,Slp Dst 156.2400,SB4-2 Side Shot: 72-78, Ang-Rt 322.2130, Zenith 90.1000, Slp Dst 198.3000, SB4-1 ide Shot: 72-79, Ang-Rt 333.0615, Zenith 90.1950, Slp Dst 119.2800, SB4-3 ide Shot: 72-80, Ang-Rt 316.1915, Zenith 90.1020, Stp Dst 99.5200, SB4-4 side Shot: 72-81, Ang-Rt 295.0840, Zenith 90.1020, Stp Dst 156.8400, SB4-5 Side Shot: 72-82, Ang-Rt 284.5730, Zenith 89.5945, Slp Dst 182.5600, SB4-7 cupy: Occ 73,N 6109.8544,E 4123.3827,Elv 0.0000,P-K IN AC

TIME: 07:07 DATE: 06-21-1995

Backsight: Occ 73,BS Pt 72,BS azm 181.3208,Back circle 0.0000 Note: BS point check:73-72, Horiz err: -0.010, Vert err: -0.906 Side Shot: 73-83, Ang-Rt 261.2415, Zenith 89.1010, Slp Dst 265.1000, SB5-3 Side Shot: 73-84, Ang-Rt 259.4210, Zenith 91.0920, Slp Dst 243.1200, SB5-4 Side Shot: 73-85, Ang-Rt 256.4720, Zenith 89.3525, Slp Dst 289.0600, SB5-2 Side Shot: 73-86, Ang-Rt 235.5320, Zenith 91.4730, Slp Dst 231.2400, MW 32 Note: Rt ang offset Off Center Shot: Ang-Rt 260.5250, Zenith 90.0510, Slp Dst 373.0000 Off Center Shot: Offset len 6.0000 Side Shot: 73-87, Ang-Rt 261.4808, Zenith 90.0510, Slp Dst 373.0480, MW30 Store: Pt 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT Note: BS point check:3-1, Horiz err: 0.009, Vert err: -3.506

Occupy: Occ 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT Backsight: Occ 3,BS Pt 1,BS azm 184.3635,Back circle 0.0000

Side Shot: 3-88,Ang-Rt 83.0945,Zenith 91.3055,Slp Dst 191.4400,SB14-5 Side Shot: 3-89,Ang-Rt 88.1010,Zenith 91.2315,Slp Dst 192.2600,SB14-3 Side Shot: 3-90,Ang-Rt 94.3330,Zenith 91.3010,Slp Dst 178.9200,SB14-2 Side Shot: 3-91, Ang-Rt 101.1330, Zenith 90.0330, Slp Dst 206.9800, SB14-1 Side Shot: 3-92,Ang-Rt 96.3710,Zenith 89.5305,Slp Dst 204.4200,SB14-4

HI / HR : Inst H 0.0000, Rod H 0.6500 Note: BS point check:3-1, Horiz err: 0.004, Vert err: -4.362

Occupy: Occ 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT Backsight: Occ 3,BS Pt 1,BS azm 184.3635,Back circle 0.0000

Side Shot: 3-93,Ang-Rt 97.3630,Zenith 90.0035,Slp Dst 187.5250,MW 15

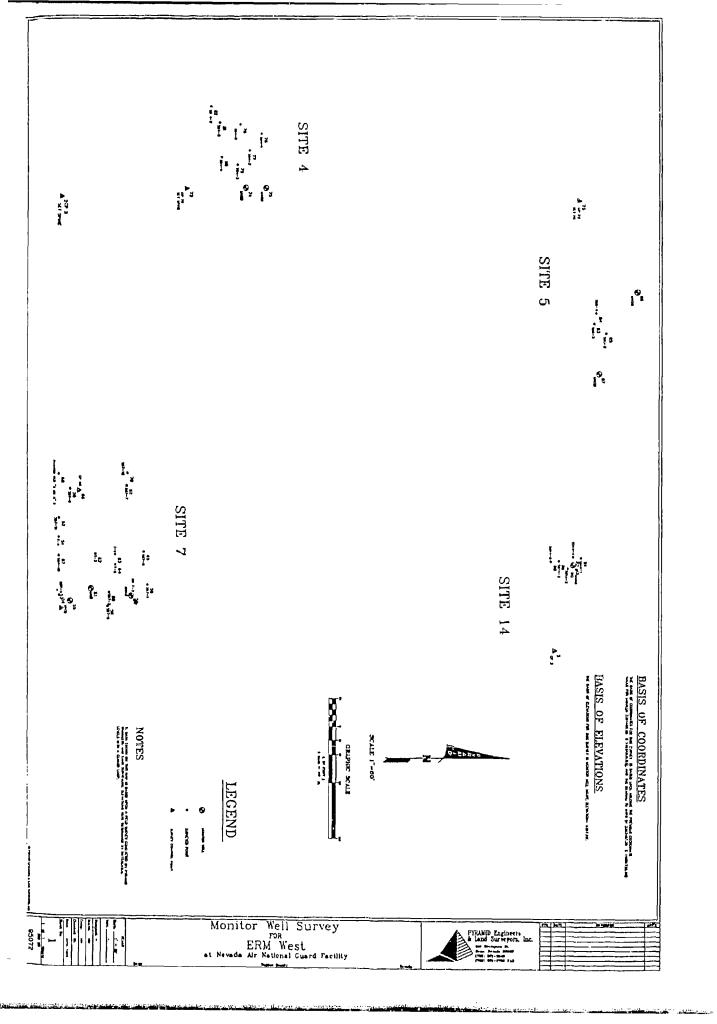
#### SURVEY BY PYRAMID ENGINEERS AT NEVADA AIR GUARD FACILITY

WELL #	GROUND ELEV. FT. AMSL	CASING ELEVATION FT. AMSL	
MW7	4398.26	4397.91	OLDER WELL
MW15	4403.23	4402.75	OLDER WELL
MW18	4402.93	4402.58	OLDER WELL
MW28	4404.30	4404.03	NEW WELL
MW29	4404.32	4404.05	NEW WELL
MW30	4404.72	4404.48	NEW WELL
MW32	4402.12	4401.89	NEW WELL
N.U.Z.I	4 2 33 -4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

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וולפחווגם	A こう と	00,000.00	51-50-57-1 B	•	17.00.10	Sh-(1/- 22)		i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de l	10 - 10 - 10 - 10 M	17.6-30	¥	NA (10-15 CF)	473 B 270 - 15 m	10-KI 10:	Y		X @ Pr = 72 BS PT	75	74 DIKT WIELT	77	6.	2 2		->	3	11 X = 07-1 0		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		•	uv va	

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#### PYRAMID Engineers & Land Surveyors

330 Crampton St. • Reno, Nevada 89502

(702) 329-2540 FAX (702) 329-2768 Thomas J. Gribbin, P.L.S., President James E. Arden, P.E., Principal J. Ric Adler, P.E., Associate Patrick E. Fritchel, P.E., Associate Melissa J. Lindell, AICP, Associate Michael J. Miller, P.L.S., Associate

July 31, 1995 File No. 95072

RECEIVED

ERM West, Inc. Attn: Robin Weesner 5111 North Scottsdale Road, Suite 108 Scottsdale, AZ 85230

AUG - 7 1995

PHOENIX, AZ.

RE: Nevada Air National Guard Monitor Well Survey

Dear Ms. Weesner:

This note is in reference to your facsimile dated July 25, 1995 reguarding a problem with Point Number 50. I visited the site to investigate the problem and discovered SB7-6 was incorrectly marked as Point Number 50. It should have been labeled Point Number 68. The initial field crew noted a porblem reading labels on the asphault due to weathering. I hope this will clarify the data. Please let me know if I can answer any other questions.

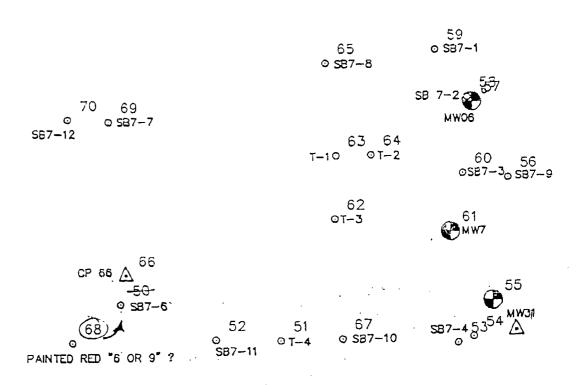
Sincerely,

PYRAMID Engineers & Land Surveyors, Inc.

Associate

MJM/lsc

# SITE 7



#### APPENDIX E

CHAIN-OF-CUSTODY RECORDS

GULF STATES ANALYTICAL, INC. 6310 Rothway Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646	 FAX (713) 690-5646,	7 Pr	
Company: ERM-West, Inc.	Phone No: 602-990-9350 Fax No: 602-990-0107	emivolati platiles, urge Arom PH, Gasol ead by Fl	
Reports Sent To: Ms. Robin Weesner	Project Location: Reno, NV	Priority atics/Ha ine Range	
Project Name: RI/FS NVANG	P.O./Project Number: 6001.3	y Polluta locarbons e, Organic	
Sampler(s) Name: (Signature)	XX. Rah	ant (824 , GC (8 s (8015	
Courier: Courier:	Sampling Sampling	0) 0522 010/802 0) 05486 Contair Othe 0il	
FIELD SAMPLE ID		eners	
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MW17-95-2	×25/2/85 0925	7 XXX X	
	× , ,		
135 352	05/14/8 1140 X	7 XXX X	
MW18-95-2	X (25/12/45/1305/X	7 XXX X	
8 mw/8-95-2*	x 5021 8ph/20	X	
11 MW2L-95-2	x 56/1/50	2 4XX X	
13/1/W26-95-2X	x 22/1/6/1/50	7 XXX X	
0rder #15766	Requested Turnaround: Spx NORMAL ON	Special Detection Limits: at Package:  Can firm all Voc delects	by 8240
			-

#### GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST

CLIENT:	ERMW		CONTACT: Nobih Mines int								
ROJECT:	RI/FS A	NANG	CARRIER: FEALEX								
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		KIT	CHECKLIST								
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	PRESENT	PRESENT?	INTACT?		CONTAINERS						
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	Projœt Ma	mager		Total _							

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	Ber _{ne} burya		S ANALYTICAL, ECEIPT CHECKL			
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PROJECT: K	I/FS	NVAna	CARRIER			
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DATE SHIPPED:	5/15	95	UNPACK	4 .	Reyes	
NUMBER OF KITS	RECEIVED:	2	− GROUP#_	110291 B.O	# UDLO6	
		KIT	CHECKLIST			
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	PRESENT	PRESENT?	INTACT?		CONTAINERS	
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217	ارمار	c No	SU.	4 0(	$\bigcap$	
267	70	B NO	NO	/		
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MW25-95	5-2 a	el	ii.	segu phin	as a gadad	
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Project Manager_

5409500202 5409500202 05-13-95 -84-9535-6 Robin G Weesner ECZ-990-9350 LEFF ELALFF FEM WEST INC GULF STATES ANALYTICAL INC. TILL N SCETTSTALE RE STE 108 _____ 6310 FETHWAY & S & S C CLSTEN TX 7 7 2 4 C ECETTSDALE ·cc: Hoolar 1002 (cocumulased 5409500213 1784-9535-6 65-13-45 cobin G. Weesnar ECZ-590-5350 LUFF ELNLAP EFY WEST INC GLLE STATES ANALYTICAL INC. TILL N SCOTTSCALE BD STE 108 EBIC PETHNAY SCETTSDALE TX 7, 7, 0, 4 C. icci Goler 2062 1155-0512-2

160

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Request for Analysis	Vol Pur TPH	atiles, ge Arom I, Gasol	Pric matics ine R	rity /Hal ange	SOW OLMO Polluta ocarbons Organic 420) 025	nt (82 , GC ( s (801 5B	8010/80	2 20) 05			7 XXX X		7 X X X V				XXX X						ion Límits: QC Package:
	LX (713) 090-5046	Phone No: 602-990-9350 Fax No: 602-990-0107	Project Location:	Bono NV	P.O./Project Number: 6001	Matrix Matrix	Oth Sampling Sampling	dge l	: X250 04/1/00	×	- Not Splated	X	L   X 2021 641 150	X 7120	05/149c 1315x	X	1316x 1316x	X	*	×	×	×	Requested Turnaround:  * NORMAL  NORMAL  *   Not
GULF STATE	Ui she	CAN COMPANY:  CAN COMPANY:  CAN COMPANY:  CAN COMPANY:  CAN CAN COMPANY:  CAN CAN CAN CAN CAN CAN CAN CAN CAN CAN	Signa Bu	ture	540		Courier: Courier:	FIELD SAMPLE ID	1-56/15081 - Dat Dat Dat	e: 5/95 e:	Tim	4 e: 30 e:	Rec	eive		<u>X</u> : (S	x C-So-Olm 6 gnatignation	ure)	)	TI TI TI TI TI TI TI TI TI TI TI TI TI T	(97	14	Sales Order #15766   Wa true!   Sales Order #15766   Wall 1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900   1900

# GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST - West Contact: Robin Wessice CARRIER: PAN 1995 MAY 16 AM 8: 53 UNPACKED STAMP:

UNPACKED BY:

GROUP#

6304

### KIT CHECKLIST

KITID	COC	CUSTOD	Y TAPE	COOLER TEMP	# OF SAMPLE
	PRESENT	PRESENT?	INTACT?		CONTAINERS
451	\.	c 4-65	1/21	20	2
7 < b	11-25	B // (*)	NI		29
		С	•		
	_	В			
		С			
		В			

C = COOLER B = BOTTLES

CLIENT:

PROJECT:

DATE RECEIVED:

DATE SHIPPED:

NUMBER OF KITS RECEIVED:

### INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW-10-96-2#	Motels	not in cooler
,	u .	

PRESERVATIVES CHECKED YES NO SEE ABOVE NOTES

(Water only)

ACTION TAKEN

PERSON CONTACTED:

RESOLUTION

GSAI EMPLOYEE

DATE:

HN03

HCL

H2S04

NAOH

NAOH

Na2S203

NEAT

OT/PRE.

(Water Only)

/OVOA
//OTHER

ZVOA PZOTHER

Z9 (1)301
Total 29

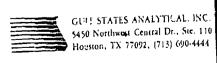
Mtrx.

# Cont.

Remaining Samples in Group

Project Manager_

5409434796 05/15/95 2784-9535-6 602-990-9350 Robin Wesner LEFA TUNLAP TTY WEST INC CLLF STATES ANALYTICAL INC. F111 A SCOTTSDALE AD STE 108 SSIC FETHWAY 102TTSTALE FEUSTER cooler 1 of 1 (coc unside) 1155-0512-2 153 REVISION DATE 4'94 160 **CUSTODY SEAL** GULF STATES ANALYTICAL, INC. 5450 Northwest Central D .. Ste. 110 Houston, TX 77092, (713) 690-4444 Dat



CUSTO DY SEAL

Date/Time______Name/Company______



60 16331

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Rel	inqui	she	Company: Phone No: ERM-West, Inc.	San	i gna	: (S	540	ire)	Sampler(s) Name: (Signature)	Courier: Followill Express sampling	D Date Time	X 0500 7 505/645-1	e: /1/60 e:	-1-1785	5-1-495 :: 00 ::	Rec	X SSA X SSA - 1 - 485 eiver Leiver	DE I by	-X : (S)	X 0021 \ S12 0 - 485 gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gnat \ gn	ure)		X-5+1-5-15 00 510 10 10 10 10 10 10 10 10 10 10 10 10 1	X 53/1/1 534-5-5-535	X 341 5.5 S.S - 2.5 X		(m β (m)	(cutos cost for the redine nears souple

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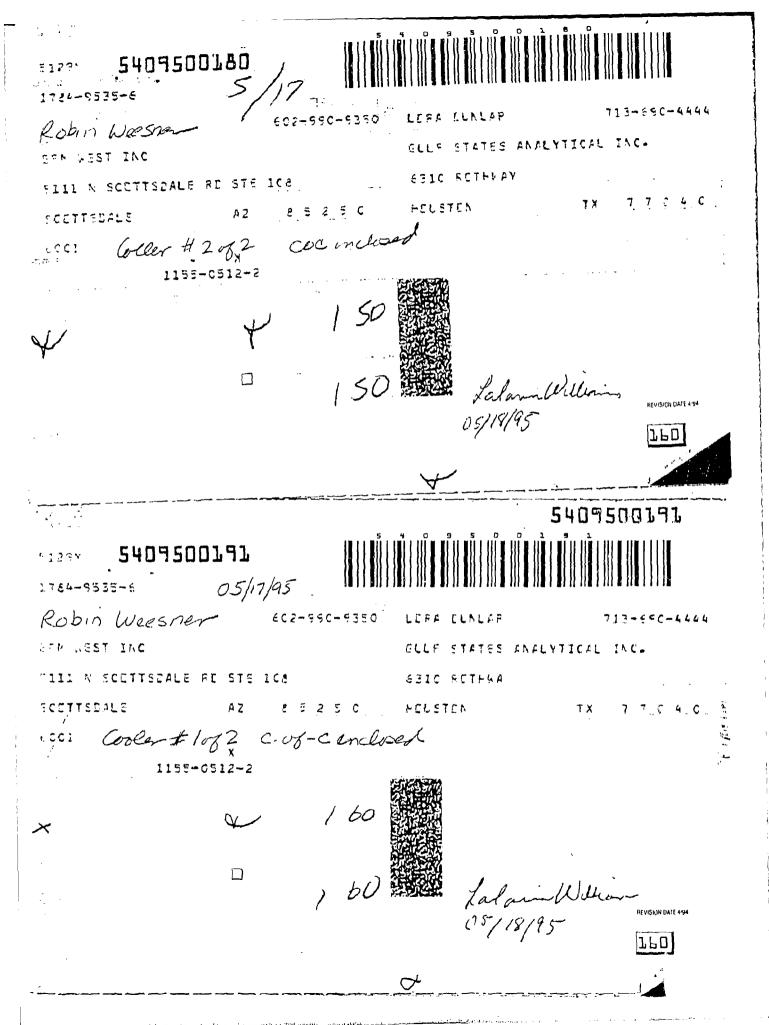
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GULF STATES ANALYTICAL, INC. 6310 Rothway E. Houston, TX 77040, (713) 690-4444, FAX (7	Company:  ERM-West, Inc.  Reports Sent To:  Ms. Robin Weesner  Project Name:  RI/FS NVANG	Sampler(s) Name: (Signature)  Struction  Gourier:  Felex  FIELD SAMPLE ID	1.59919087   Series   1.395   Date: Lime: 1.35	7-1-75 7-2-35 7-2-35 7-2-55 7-2-7.5	#15749 CVBSSER and Signiff
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DATE SHIPPED:_	.5/2	2195	UNPACKE	D BY:	· Keyes
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		KIT	CHECKLIST		•
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CUST ODY SEAL 1. STATES ANALYTICAL, INC. Date/Time 5/32/9! 5459 Northwest Central Dr., Ste. 110 ' (713) 690-4444 TODY SEAL GULF STATES ANALYTICAL, INC. 5400 Northwest Central Di., Ste. 110 Date/Time Houston, TX 77092, (7, 1) 650-4444 Name/Compar Date/Tim, CUSTODY SEAL GULF STATES ANALYTICAL, INC. 5450 Northwest Central Dr., Ste. 110 Houston, TX 77092, (71: 690-4444 CU!ODY SEAL GULF STATES ANALYTICAL, INC. 5450 Notthwest Central Dr., Ste. 110 Houston, .X 77092, (713) 690-4444

5409500154 5/22/95 1784-9535-6 713-690-4444 . FM WEST INC GLLF STATES ANALYTICAL INC. T111 N SCETTSPALE AD STE 108 EBIC PETHAN SCCTTSDALE 8 5 2 5 0 HELSTER Ecci. 31 Cooler 2 2 2 1155-0512-2 5409500143 1784-9535-6 602-990-9350 LEFA EUNLAP 713-650-4444 ESM WEST INC GULF STATES ANALYTICAL INC. S111 N SCCTTSDALE RD STE 108 SCETTSBALE AZ HELSTEN scc131 Cooler 1 of 2 1155-0512-2 REVISION DATE 4/9Page 182, 110.385

	GULF STATES ANALYTICAL, INC.	VC.					Ŗ	Request for Analysis	Analysis		
uish	E. Houston, TX 77040, (713) 690-4444, FAX (713) 690-5040	4, FAX (733) 090-3040					Vol				
	Company:	Phone No:	602-990-9350	350		- <del></del>	ati				
	ERM-West, Inc.	Fax No:	602-990-0107	107			es i	-			
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Pay 242 16385

Request for Analysis	Vo TP	etile Gas : 602-990-9350	1010-0101010101010101010101010101010101	CL, Sol	Soil OLM ids OLMO	1 List	(8270) 1201E (8240) 1178A (8015) 0538G Containers Other Oil Sludge Soil Water	0 x/2/95/24x / / XXX	05/21/95	1 1										Requested Turnaround: Special Detection Limits: QC Package: NORMAL
GULF STATES ANALYTICAL, INC.	uish	Company:	San (S	Reports Sent To: Ms. Robin Weesner	Project Name:	Sampler(s) Mame: (Signature)	Courier: Faley FIELD SAMPLE ID	Dat	1995	Tim	e: 45,	Recei	ved	by: (Suby: Lab	(Pro igna	كىز ture	)	 	+3	Sales Order #15749

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uish	GULF STATES ANALYTICAL, INC. 6310 Rothway			Reg	() Request for Analysis		
ر م	Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646	46		Se Vo			
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1: (5 br	ERM-West, Inc. Fax No:	602-990-0107		es			
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emarks: Sales Order #15	#15749 Requested Turnaround:	urnaround:	Special Detection Limits:	ı Limits:	ac Package:		
		NORMAL					

# GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST CLIENT: FM- West Suc. Contact: Robin Women PROJECT: RT/FS NYANG CARRIER: F. 2 DATE RECEIVED: UNPACKED STAMP! Y 24 PM 3: 02 DATE SHIPPED: 5/23/95 UNPACKED BY: MY NUMBER OF KITS RECEIVED: GROUP# COOLER TEMP # OF SAMPLE CONTAINERS

KIT ID	COC	CUSTOR	Y TAPE	COOLER TEMP	# OF SAMPLE
	PRESENT	PRESENT?	INTACT?		CONTAINERS
2	Vac	c Ver	29/	2400	- 77
824	157	B NO	NOI	7	
		С			
		В			
		C			
		В			

C = COOLER B= BOTTLES

### INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
587-11*	semi - UOA	bottle Jane bother HNB3 + NAZSZO3
	11	stickers ph 7/used metals
		label on Seni-voo battles
PRESERVATIVES CHECKI	ED YES NO SEE A	BOVE NOTES

PRESERVATIVES CHECKED YES NO SEE ABOVE NOTES

(Water only)

ACTION TAKEN

PERSON CONTACTED: DATE:

RESOLUTION

GSAI EMPLOYEE DATE:

HN03 4 HCL H2SO4 NAOH NAOH Na2S2O3 NEAT OT/PRE.

(Water Only) # Cont. Mtrx.

4VOA OTHER 2 VOA OTHER

8 8 MM WA SO
Total 77

Remaining Samples in Group

Project Manager_______

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Company SEST INC	Department/Floor N	[ ' '	ANALWIICAL IN	Department/Floor No.
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16 FEDEX LETTER 56 FEDEX LETTER 12 FEDEX PAK 52 FEDEX PAK	Saturday Service  31 HOLD AT FEDEX LOCATION SATURDAY	City	Zip Zip	Other t
FEDEX BOX 53 FEDEX BOX	Fill in Section (4)  3 DELIVER SATURDAY Total Total Total Total Total Total Total Total Total	Total Program Buy	127	Other 2
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† Delivery commitment may Declared Nature Limit \$500 to later in forme small "Car for delivery schaoute."	12   HOLIDAT DELIVERY (FOR PRO) 2.7 Cm.Ca. S	Release Signature:	<u>,                                     </u>	
	Dr., Sic. 110	5450 Notthwest Central Houston, TX 17092, (7)		
		TODY &	AL 05-/2-3/	Seal Broken by
	mpany	Wine		5-24

CIJSTODY SEAL

GULF STATES ANALYTICAL, INC. 5450 Northwest Central Dr., Ste. 110 Houston, TX 77092, (713) 690-4444

Date/Time

Name/Company

Vol	mîvolatiles TCL, latiles TCL, Soli H, Gasoline Range	ids OLM01	List (82 s, SW (80	240) 1178A 015) 0538G ontainers Other Oil Sludge Soil	X	)     XXX			XXX - NAT - XXX		× × ×				Special Detection Limits: QC Package:		
GULF STATES ANALYTICAL, INC. 6310 Rothway Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646	Company:  ERM-West, Inc.  Fax No: 602-990-9350  Fax No: 602-990-0107  Reports Sent Io:  Mg. Robin Weesner  Sife	Project Name: P.O./Project Number: RI/FS NVANG 6001, 3	Sampler(s) Name: (Signature) Shave Deckar IE A Buh	Courier: Federal Expess Sampling	1300 State 1300	587-2-3.5 OS/1916	S877-3-5.5	381-5-55 X 587-3-75	587-4-1.5	1581-4-3.5	587-4-5.5 587-4-7.5	0AB-1 osluje		2 Care	Requested Turnaround: #15749 NORMAL	ranged	Goggest Row Cooler.
Relinquish Sh (DO)	201	4095	es_	ط	OS Da	te: 5 (4/5) te: 6/9/5	Time:	Red	ceive	des deby:	(Signa (Signa	iture)	(Signat	ture)	 sales Order		

# GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST

CLIENT:	FRM - Wes	<u>. t</u>	CONTACT	CONTACT: Robin Weeslier								
PROTECT: R	I/FS NU	ING	CARRIER:	- Fed Ex								
DATE RECEIVE	D:1995_MAY_2	20 AM 10: 42	UNPACKE	ED STAMP: 1995 MAY	20 AM II: 15							
DATE SHIPPED:	5-1	9-20	_ UNPACKE	ED BY: AP								
NUMBER OF KI	rs received:	j	GROUP#_	16367 B.C								
		· KIT	CHECKLIST	T16406								
KITID	COC PRESENT	CUSTOR	Y TAPE	COOLER TEMP	# OF SAMPLE CONTAINERS							
	PRESERT	PRESENT?	INTACT?		CONTAINERS							
427	yes	C 403 B 100	yes No	2°C	22							
	· · · · · · · · · · · · · · · · · · ·	C	νω									
		В										
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C = COOLER I	C = COOLER B= BOTTLES  INCONSISTENCIES											
SAMP	LE	PARAMET			SISTENCY							
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ļ			ii.									
	<u></u>											
PRESERVATIVE (Water only)	ES CHECKED YE	s NO	SEE ABOVE N	IOTES								
PERSON CONTA	ACTED:	ACT	TION TAKEN	DATE:								
RESOLUTION_												
GSAI EMPLOYE		<u> </u>	DAT									
HNO3	HCL H		2 Na2S2O3	2 NEAT O	T/PRE.							
	jı	(Water Only)	,		# Cont. Mirx.							
	4_voa 2_other		<u></u>	DA THER	14 50							
Remaining Sampl	es in Group	5 overlage			y Wa							
		·	Total 22									
	Project Ma	miaRci										

540950017 STABLE'S FEOLENT TXPRESS ACCORD SUMBLE 1784-9535-6 (713-690-4444 GULF STATES ANALYTICAL INC. ERK WEST INC Street Address SIII N SCOTTSDALE RD STE 108 6310 ROTHRAY City SCETTSDALE AZ HEUSTEN IF HOLD AT FEDEX LCCATION, Print FEDEX Address Have YOUR INTERNAL BILLING REPTAINCE HAT? 6001.31 ZIPReguien 1155-0512-2 SERVICES (Check on the co PARCES Filtere a. ta <u>El</u>feder Ma Frences, Farilles REVISION DATE 4/94 760 GULF STATES ANALYTICAL, INC. 5450 Northwest Central Dr., Ste. 110 Date/Time. Houston, TX 77092, (713) 690-4444 Name/Company GULF STATES ANALYTICAL, INC. 5450 Northwest Central Dr., Ste. 110 Date/ Time. Houston, TX 77092, (713) 690-4444 Name 3/Company_

16421 tug 1062

Vo	emivolatiles TCL, Soil OLMO Statiles TCL, Solids OLMO PH, Gasoline Range Organic	List (8240) 1178A s, SW (8015) 0538G	X XX ·	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X		Special Detection Limits: QC Package:
X (713) 690-5646	Phone No: 6C2-990-9350  Fax No: 6C2-990-9350  Project Location:  VANO / Sile 7  P.O./Project Number: 6001, 3	Sampling Date Time	13/24/44		155°   160°     150°     150°     150°     150°     150°     150°       150°       150°		Requested Turnaround:  NORWAL  Orovit ded fav  Orovit ded fav
GULF STATES ANALYTICAL, INC. 6310 Rothway Houston, TX 77040, (713) 690-4444, FAX	Company: ERM-West, Inc. Reports Sent Io: Ms. Robin Weesner Project Name: RI/FS NVANG	Sampler(s) Name: (Signature)  Steve Berker  Courier: Frdexul Express  FIELD SAMPLE ID	TB052495-1 5814-1-35	5014-2-35	5814-2- 5814-2-3 5014-3-5 2014-3-		#15749 Note only one vial
Relinquis	hed by Sampler: (Signature)  hed by: (Signature)  OD1, 79 Bill # 5		Date: US/25/45 Date: Date:	Time:  //wr  Time:	FEDEX Received by: (Sig	gnature) gnature) rstory: (Signature) (( )	marks:

S.A. 152.06/April 10, 1995

of Other

Remaining Samples in Group Sx overlap with broup 16424

Project Manager LRM for Lorar

OTHER

# Cont.

Total 50

Mtrx.

WA

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٠.			ا ' بم	Seal broken by
	GULF STATES ANALYTICAL, INC.	CUSTODY SE	AL	271/196
	5450 Northwert Central Dr., Ste. 110 Houston, TX 77092, (713) 690-4444	Date/Time 5/75/95 4:	37	XN + 122/4?
		Name/Company New Meliking	- TKII-West	3
£/	- I - Troma			
<b>75</b> /5	C' MI	VCompany IE & M. West 1	Nama	
102/5		15:10 76/3 18/4 omit	Cearest Dr., Sie. 110 Daie/	Houston, TX 77
укей ру	Seal bro	COS. LODY SEAL	יאַצוֹגעוכער' ואכי	CULF STATES
	•		, Si	

J 150

REVISION DATE 4/94

LW 5/24/85-160

### GULF STATES ANALYTICAL, INC.

## ADDITIONAL

		INCONSISTENCIES	1642
SAMPLE	PARAMETER	INCONSISTENCY	
SBH	VDA	The HCl is marked out on	the hottle
SAMPLE	PARAMETER	INCONSISTENCY	
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Validated By_		Project Manager	LRM for Lona
10/92		S.A. 152.05	<del></del>

Relinquished by: (Signatu							`	1011						
hed by Sampler:	GULF STATES ANALYTICAL, INC. 6310 Rothway Houston, TX 77040, (713) 690-4444, FAX (71	AX (713) 690-5646						Reg	Request for Analysis	Analysie				37 4
oy Sampler: - Sé oy: (Signati	Brty:	Phone No:	602-990-9350	9350			грн, а	/olat	Sami w					
mpler: Se Signati	ERM-West, Inc.	Fax No:	602-990-0107	0107		,	Sasol	iles,	1 24:			-		
	Reports Sent To: Mr. Robin Weesner	Project Location:	ition:				ine Ra	Prior	lac to		<u>·</u>	رت پ	7.7	7
(Signat	Project Wame:	P.O./Project Nurber:	t Number: 6001, 31				(7420)	ity Poll Halocarb	L, SOW C	- 1/2 - B-	المراجعة المراجعة	36	·22	Ş
	ler(s) Name: (Signature) /	#01:	1			-	nies 02558	utant	7	7				
~~~	Steven Retire Orl	San X			Matrix	<u> </u>	(8015)	(8240		<u> </u>				
Couri	5		Sampling	ing	Slu Soi Wat	Oth Dil	0548	X 0522	9270	751				
5/	EID		Date	Time	dge l	er	1/2	2	.7	<u> </u>				
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Remarks: Sales Order #15766	10	Requested Turnaround:	around:		Special	Detecti	Special Detection Limits:	::	OC Package:	:ade:				

DIAL METALS (CO Request for Analysis 16434 8020 Package ä Semivolatiles TCL, SOW OLMO1 List (8270) 0923E Volatiles, Priority Pollutant (8240) 0522 Purge Aromatics/Halocarbons, GC (8010/8020) 05|5 Special Detection Limits: TPH, Gasoline Range Organics (8015) 0548G Lead by Flame AA (7420) 02558 # of Containers لان 5 Other Oil Sludge Soil Water 135 645 935 602-990-9350 Time 602-990-0107 Sampling x956x 16,1009 P.O./Project Number: NORMAL Date Requested Turnaround: Project Location: Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646 Fax No: GULF STATES ANALYTICAL, INC Sampler(s) Name: (Signature) Ms. Robin Weesner MW 33-95~3 ERM-West, Inc. TB053595-1 6-29-18WM FIELD SAMPLE ID F- 69-40WM BAKER LENK Reports Sent To: RI/FS NVANG 6310 Rothway Project Name: Remarks: Sales Order #15766 Date: Received by: (Signature) 24/90940 Federal Express Received by: (Signature) Relinquished by: (Signature) Date: Time: Referred by Laboratory: (Signature)

~	GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST								
CLIENT: ER	m - 12		CONTAC	r: <u>Ms. Rub</u>	in Weesner				
PROJECT:		2I/FS NVA	MG CARRIER	16 CARRIER: FEDEX					
DATE RECEIVED	1995 MAY	27 AM 11: 19	UNPACKI	EDISTAND 27 AM	11: 39				
DATE SHIPPED:_	5/21	0 95	UNPACKI	ED BY: Xal Crn	in William				
NUMBER OF KITS	S RECEIVED:_	3	GROUP#_	16434 B.O	· Lacolo7				
		· KIT	CHECKLIST		•				
KIT ID	COC	CUSTOR	y tape	COOLER TEMP	# OF SAMPLE				
	PRESENT	PRESENT?	INTACT?		соитуйный				
768	405	c yes	405	100	18				
140	1 1	BNO	rou						
757	405	B NO	Y 45	12°C	30				
Small	1/0	c yes	405	300	4/				
blay white	79 0	B NO	No	7 3 6					
C = COOLER B	C = COOLER B = EOTTLES INCONSISTENCIES								
SAMPL	E	PARAMET	ER	INCONSISTENCY .					
MW31-		ICPMT		pH of added Int al HIVI: pH					
987T-4		1) VUA "	" Didn't have a COC						
5B7T-	3 '	(1) 10A "		Didn't have	~ (LUC)				
DUDOEDAL A MESTE		VICE V NO	CET ADOMES	IOTEG					
PRESERVATIVE (Water only)	S CHECKED		SEE ABOVE N	OTES					
PERSON CONTA	CTED: New	ine Ac	TION TAKEN	DATE: 5	131/95				
RESOLUTION SI	B7T-4 \$	587T-3 came	mazied	blue cooler, SA	received no COC				
analyse Conox WWW.	92-12, NW 32	-95-2 and MW31:	0000	E: 5 31 95 00	Fun Contical Parameter 4-95-2. Pun Boio BOLT				
GSAI EMPLOYER		ray field		20					
HNO3	HCL —	H2SO4 NAOH (Water Only)	Na2S2O3	NEAT LOT	r/Pre.				
20 -	VOA ZZOTHER	(11.11.02.02)	20 v	04	# Cont. Mtrx.				
	22OTHER			THER	(c) (c)				
Remaining Sample	s in Group								
- ·					Potal / ?				
	Project	Manager LRM Lon	Lora		Total_(:				

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, 1X 77092, (713) 690-4444

CUSTODY SEAL

9:50 ERH. West

12.W.5/27/

Seal broken by

GULF STATES ANALYTICAL, INC. 5450 Northwest Central Dr., Ste. 110 Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Seal broken by

Date/Time_

Date/Time5

9.50

Name/Company Name Melikian FRM West

8 m 2 3 27145

GULF STATES ANALYTIC AL, INC. 5450 Northwest Central Dil. Ste. 110 Houston, TA 77092, (713) 6y0-4444

CUSTODY SEAL

Late/Time 5/86/95 9:50

Name/Company Name Alik -

Seal broken by

Day (

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£4-9535-6	5/26/95			
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ievine Melikian	€ (12-5' C-53EO" LERF LUNG	ES ANALYTICAL INC	7
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713-690-4444

GULF STATES ANALYTICAL INC.

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REVISION DATE 4/94

Dr. L. Wmo 5/27/95



OC Package Semivolatiles TCL, Soil OLMO1 List (8270) Special Detection Limits: Volatiles TCL, Solids OLMO1 List (8240) TPH, Gasoline Range Organics, SW (8015) 05386 Other Oil Sludge Soil Water 0900 QFSS 21/50 NUA NG-/5te 14 Phone No: 602-990-9350 602-990-0107 Sampling P.O./Project Number: NORMAL Date Requested Turnaround: Project Location: 6310 Rothway Houston, TX 77040, (713) 690-444, FAX (713) 690-5646 Fax No: GULF STATES ANALYTICAL, INC. Steve Brky Reports Sent To: Company: ERM-West, Inc. FIELD SAMPLE ID Sampler(s) Name: (Sign S814-5-3.5 Project Name:
RI/FS N'ANG Sales Order #15749 Received by: (Signature)

					S ANALYTICAL, CEIPT CHECKL		**	
CLIENT:	ER	m-u	<u>Je</u>	s-b.	CONTAC	T: Robin (Neesne	
		I/F5 1995 HAY			CARRIER	. Fedex	<u>.</u> .	
DATE RI	BCEIVED	1995 MAY	726	AM 9: 06	UNPACK	1995 MAY 26 ED STAMP:	AM 9: 34	
		5/05		75	_ UNPACK	ED BYZAL a	ia Wi	llian
		S RECEIVED		2	GROUP#	76421 B.	0.1 6007	5
				KIT	CHECKLIST	16 441 m	o ki	
KI	.D	COC		CUSTOD	y tape	COOLER TEMP		
		PRESENT	Г	PRESENT?	INTACT?		CONTAI	NERS
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	SAMPI			PARAMET			NSISTENCY	
MI MI	W05	·95-a		PARAMET SV ORG		Bottle was	broken	when the
FA+	2006 2004	-95-2 95-2	Y	PARAMET 30 ORG DA "	ER '	Bottle was	broken	when the
M	WO5- 2016	-95-2 95-2	¥ V	PARAMET SV ORG DA- "	ER '	Bottle was cooler of Bottle was	broken broken	when the
mu mu	2005- 2015- 2015-	-95-2 -95-2 -95-2 -95-2	V 	PARAMET SV DRG DA # OA CPMT	ER 	Bottle was cocler c Bottle was pt 4 change	broken	when the
mu mu	WO5- WO5- WO5- WATIVE	-95-2 95-2 95-2	V 	PARAMET SVORG DA # OA CPMT NO	ER " " SEE ABOVE	Bottle was cocler c Bottle was pt 4 change	broken broken	when the
MU PRESER (Water or	WO5- WO5- WO5- WATIVE	-95-2 -95-2 -95-2 s checked	V 	PARAMET SVORG DA # OA CPMT NO	ER 	Bottle was cocler c Bottle was pt 4 change	broken broken	when the
MU PRESER (Water or	205- 205- 205- 205- RVATIVE aly)	-95-2 -95-2 -95-2 s checked	V 	PARAMET SVORG DA # OA CPMT NO	ER " " SEE ABOVE	Bottle was cocler of Bottle was phy change notes	broken broken	when the
PRESEIGNATION PERSON	WOS- WOS- WATIVE My) I CONTA	-95-2 -95-2 -95-2 s checked	V 	PARAMET SVORG DA # OA CPMT NO	ER " SEE ABOVE TION TAKEN	Bottle was cocler c Bottle was pt 4 charge NOTES DATE:	broken broken	when the
PRESEIGNATION PERSON	WOS- WOS- WATIVE WONTA MPLOYEI	-95-2 -95-2 -95-2 s checked cted:	V V V V V V V V V V V V V V V V V V V	PARAMET SVORG DA " OA CPMT NO AC	ER " SEE ABOVE TION TAKEN DAT	Bottle was cocler c Bottle was pt 4 charge NOTES DATE:	broken broken to pH2.	when the
PRESEIGNATION PERSON	WOS- WOS- WATIVE MINON MPLOYEI NO3	95-2 95-2 95-2 95-2 s checked cted:	V V V V V V V V V V V V V V V V V V V	PARAMET SVORG DA " OA CPMT NO AC	ER " SEE ABOVE TION TAKEN DAT	Bottle was cocler c Bottle was pt 4 charge NOTES DATE:	broken broken to pH2,	
PRESEIGNATION PERSON	WOS- WOS- WATIVE MINON MPLOYEI NO3	95-2 95-2 95-2 95-2 s checked cted:	V V V V V V V V V V V V V V V V V V V	PARAMET SVORG DA " OA CPMT NO ACT	SEE ABOVE TON TAKEN DAT Na22S2O3	Bottle was cocler c Bottle was pt 4 change NOTES DATE:	broken broken to pH2.	Mtrx.
PRESEIGNATE OF THE PERSON RESOLUTION HISTORY	WOS- WOS- WOS- RVATIVE MALOYEI MOS MPLOYEI MOS 24	95-2 95-2 95-2 -95-2 s checked cted:	YES	PARAMET SV DPG A (DA) (PMT NO ACT ACT (Water Only)	SEE ABOVE TION TAKEN DAT Na2S2O3	Bottle was cocler c Bottle was phy charge NOTES DATE:	broken broken to pH2,	Mtrx. WA
PRESEIGNATE OF THE PERSON RESOLUTION HISTORY	WOS- WOS- WOS- RVATIVE MALOYEI MOS MPLOYEI MOS 24	95-2 95-2 95-2 -95-2 s checked cted:	YES	PARAMET SV DPG A (DA) (PMT NO ACT ACT (Water Only)	SEE ABOVE TION TAKEN DAT Na2S2O3	Bottle was cocler c Bottle was phy charge NOTES DATE:	broken broken to pH2,	Mtrx.
PRESEIGNATE OF THE PERSON RESOLUTION HISTORY	WOS- WOS- WOS- RVATIVE MALOYEI MOS MPLOYEI MOS 24	95-2 95-2 95-2 SCHECKED CTED: HCL VOA ON OTHER es in Group	YES	PARAMET SVORG DA " OA CPMT NO ACT	SEE ABOVE TON TAKEN DAT Na2S2O3	Bottle was cocler c Bottle was phy charge NOTES DATE:	broken broken to pH2,	Mtrx. WA

54094348**l**l

GULF STATES ANALYTICAL, INC.

ADDITIONAL INCONSISTENCIES

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16A21	nam

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SAMPLE	PARAMETER	INCONSISTENCY
SBH	VDA	The HCl is marked out on the bottle
<u> </u>		·
SAMPLE	PARAMETER	INCONSISTENCY
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SAMPLE	PARAMETER	INCONSISTENCY
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SAMPLE	PARAMETER	INCONSISTENCY
B	1	

Validated By 10/92 S.	Project Manager LRM A. 152.05	for	Lora
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Relinq	2) uish		Signature Ms. Robin We		Sampler(s)		FIELDS	Dat Dat	/15	Tin	क्ट •:	Rec	eive	TO MADS	: (S	ignat	ure))	7.	13	14	Remarks: Sales Order #15766
S ANALYTICAL, INC.	X 77040, (713) 690-4444, FAX (713) 690-5646	Phone No:	sesner		Name: (Signature) DAMP BETTS	Jay N. Kalls	FIELD SAMPLE ID	1-8071295-1	2-35-2	2-36-62		7-56-	* 2-56-ho	2-56-	95-	2-56-22	2-36-08	32-95-2				Requested 1 48 HOUR
	46	602-993-9350 602-990-0107	Project Location:	P.O./Project Number: 6001			Sampling Date Time	- Sh/1/L	1350	6151	(1520,	1640	1/9//	7/13/95 0907	2010	1025	7211	1245				Requested Turnaround: 25. NORMAN HOUR T.A.T.
S					Matrix		Other Oil Sludge Soil Water	×	×	x	x	x	x	x	x	x	×	×	×	x		Special Detection Limits:
	Le	ed by Fl	ame AA (7420) 025		f Con	ntainers	7	2	2	2	2	7	2	2	2	7	2				ection Li
Reque	Vol Pur TPI	atiles, ge Arom i, Gasol	Priority atics/Hal ine Range	SOW OLMO y Polluta locarbons • Organic	nt (82 , GC (s (801	240) (8010	0522 /8020) 05	×	X X	XX	XX	XX	ХX	ΧX	×	ΙXX	XX	XX				mits:
V Request for Analysis			jms.															X				OC Package:
lysis																						
																_						

GULF STATES ANALYTICAL, INC. SAMPLE RECEIPT CHECKLIST

سه من سه ا ما	- Rmw	\		MS. Rab	
CLIENT:	2 1000	1 1	CONTACT	: M3. Nak	in Weggner
PROJECT:	J./FS	- NVang	_ CARRIER:	- eax)
DATE RECEIVED	1995 JUL 14	AN 8: 47	UNPACKE	D STAMPU95 JUL 1	4 FH 2: 18
DATE SHIPPED:_	7 -	13-95	UNPACKE		}
NUMBER OF KIT	S RECEIVED:		GROUP#_	5 7-14 B.O	1062
	•	· KIT	CHECKLIST	18986	•
KITID	COC PRESENT	CUSTOD	Y TAPE	COOLER TEMP	FOF SAMPLE CONTAINERS
,	PARISMI	PRESENT	INTACT?		COMMINION
71	1125	c No	67)	1311	22
i,	1/1/	в ур	24	<u> </u>	
		C		_	
		В		 	
		В	<u> </u>	4	
C = COOLER B	BOTTLES				
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Request for Analysis OC Perhage: MS/MSD Semivolatiles TCL, SOW OLMO1 List (8270) 09235 Volatiles, Priority Pollutant (8240) 0522 Rurge Aromatics/Halocarbons, GC (8010/8020) 05|5> Special Detection Limits: TPH, Gasoline Range Organics (8015) 0548G Lead by Flame AA (7420) 02558 N # of Containers И 6 4 N N 7 Ŋ N 2 4 Other Oil Matrix Sludge Soil Water 1350 0997 8860 1640 1025 1641 6151 1520 120 I me Phone No: 602-990-9350 602-990-0107 Sampling 56/21/2 P.O./Project Number: Requested Turnaround: Date 6001 Project Location: 5310 Rothway Houston, TX 77040, (713) 690-444, FAX (713) 690-5646 48 HOUR Fax No: OULF STATES ANALYTICAL, INC. Name: (Signature) DAX **ピースカー たりへん** MW30-95-2 MW29-95-2 MW04-95-2 MW05-95-MW24-95--56-50MW MW29-95-Ms. Robin Weesner FIELD SAMPLE ID ERM-West, Inc. Reports Sent To: RI/FS MVANG なととか Project Name: Sampler(s) Remarks: Sales Order #15766 Courier Received by: (Signature) nquished by Date: 13/15/500 Time: Received by: (Signature) Relinquished by: (Signature)

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ERM-West, Inc. 111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM

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Chain-of-Custody Record Weather --

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.M-West, Inc.

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ERM

Chain-of-Custody Record Date 8-11-95 Weather 2.44 Cloudy 14 age 1 of

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ERM-West, Inc. fax (602)990-0107 KM 5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM

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fax (602)990-0107

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM

Chain-of-Custody Record

Date 8-23-95... Weather Clear, Het. Page. | of ...

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ERM-West, Inc. fax (602)990-0107 RM 5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM

Date 8-24-55. weather Live Clear Page 1- of 1. Chain-of-Custody Record.

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Job # 6001.32	Sampler (signature) Tunner Printed name Frunk Lab Report Recipient Robin Telephone No. 714-258 Receiving Lab Quanterna Address 173/50414 bro	MW17-95-3	MW05-95-3 12:40	MWC6-65-3	MW06-45-34					1		Precautions:	Sample Relinquished By	. 31	Company E		Company	LABORATORY- Please Complete	Lab sample custodian NOCL- (Lut 1
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Date 2-24-65 Weather Clar, With Page 1 of 1

	Remarks	Number of Containers	1 Tris Blut	8 CLP Packers	3 1 11 8	11 10						_/	rs: 38	ng Bill Number)	21813			٠	Hold days
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		624-8240 Purgeables (Volatile Organics) 625-8270 BNAs & Pest. (Semivolatile Organics) 618-1 Tot. Recoverable Petroleum Hydroc		\times		×		7					Tot		419301912			No. of containers metches C-of-C	n Return to Site
N ESTATA		8015M Purgeables (Gazoline) 8015M Extractables (Dreset) 601/ 8010 Halogenated Hydrocarbons 602/ 8020 Aromatic Hydrocarbons (BTEX)	XX		- 文文文 ス	イスペン	1						Ship Via: Falle+	Date Time	S/WE	(4:0) ph			Sample Disposition
COG - (COC) - COG	Collection	Preservative Sampling Method	/K1	大 語 房本	ここと	2 2 2] Med ☐ Hi ☐ Sh	By	and lina	3		Semplas not sesting	Time
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of ITM. Scottsdale rioad,	15.1009 # gor	Job Location Pence / Mills Sampler (signature) Frunt Lab Printed name Frunt Lab Lab Report Recipient Reby Telephone No. 714-358 Receiving Lab Quarterra Address / 121 South Carter Sample ID# Time Westername ID# Time ID# T	-	Muy -65-3 8:45	1	MW07-95-3 15.45							Precautions:	Sample Relinquished By	Tronk Junger	FO	Company	LABORATORY-	Leb sample custodian

FIRM-West, Inc. 111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM

Chain-of-Custody Record Date 8-35-95 Weather Sunny, William Page 1 of アンドルング

Coolers Trip Blant Remarks Shippod in the Reason for Transfer (List Shipping Bill Number) 4193019110 Total Number of Containers: 45 Number of Containers Other Discard norg Cooler seats
Intact PCHL মতা SIR!OM 4/4/30/11/06 #18.1 Tot. Recoverable Petroleum Hydrocarbons No. of containers

matches C-of-C 625-8270 BNAs & Pest. (Semivolatile Organics) 624-8240 Purgeables (Volatile Organics) Time Fede 602\ 8020 Aromatic Hydrocarbons (ETEX) Date 1/2/8 601/8010 Halogenated Hydrocarbons Ship Via: 8015M Extractables (Dieset) 8015M Purgesbies (Gasoline) Samples not leaking Ruler company Quanterc _ Conc: Lo 📋 Med 🗀 Hi Sampling Method Collection 13 女 Preservative **~** ž CED Received By IN Sels <u>چ</u> Company بر الرواد الرواد Samples at C Z Container type W-water C-comp Voiume C \$ Kobin Weesner Time 92169 8-15-11:00 amphore Telephone No. Quanterra Analytical Signature Phi 7 3 South Gren ALL Receiving Lab 714-258-8610 J \simeq Samples
Intact Date NV 4.66 -3 heat 3 Printed name Frank 8.45 Mw35-953X18:46 MWT4-95-3 10:05 Time MWT4-953米 10.85 Company Plan - Wost Lab Report Recipient Sample Relinquished By Sampler (signature) Job Location Renu Job #6001.32 Junta Ana Leb sample custodian Address [7] 3082595-Then In MW25-95-3 Sample ID# Precautions: Company

days

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Return to Site

Sample Disposition

fax (602)990-0107

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Chain-of-Custody Record

Date 8-32-15. Weather Cutt, with Page

TRIP BLANK days Remarks Reason for Transfer (List Shipping Bill Number) 몽 Number of Containers Do Total Number of Containers: Other Discard 793 Inorg Cooler seels Intest CHOI THLE OAZZ Retals 5250766 Return to Site 418.1 Tot. Recoverable Petroleum Hydrocarbons No. of containers
matches Cof.c \times 625-8270 BNAs & Pest. (Semivolatile Organics) (spinagro elitalov) seldaegrug 028-28-458 Sample Disposition 10:W Time Rich 90S/ 80S0 Aromatic Hydrocarbons (BTEX) 11/2/2/ Date 601/8010 Halogenated Hydrocarbons Ship Via: 47 /7-8015M Extractables-(Dices!)-× 8015M Purgeables (Gasoline) Semples not leaking (Xuan terr HADS BALLET Time (0:00) 4 Ϊ **Bampling Method** Collection Preservative Med *WOW! 4 L M. A. X. X. X Received By CED 11-14-9[Company 25. 24.7 Conc: Lo Company Samples at 4.0 Container type /m & W=water C=comp | Volume S=soil G=grab | Volume Receiving Lab GUANDOLLA ANAYTKAL CA. 91705 Lab Report Recipient ROBIN WEESNER Time DAVIDS. BETTS S. GRAND AVE. (714)258-8610 Ü R 11/3/63 Semples Reso/Nows Signature Date 3 ANA, 6001.32 Time MM18-95-4* 1449 8771 Gample Relinquished By ERM-WEST Sampler (signature) SAMPA LABORATORY-Please Complete Lab sample custodian RWZ Address 1721 TB111395-1 4-56-81MM Telephone No.(Sample ID# Printed name Job Location Precautions: NOFL Company Company # qof

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Chain-of-Custody Record

Date 11-14-15. Weather CLEME, with Page 1 of

1N TWO(4 COOLERS SAMPLES days 15954 SAPPET Remarks M5/M5D Reason for Transfer (List Shipping Bill Number) Total Number of Containers: 58 <u>볼</u> Number of Containers 4 80 b 7920525804 Ø 80 Do 6 Do 7920525815 Inorg Other Discard Cooler seals Intact 211101 0426 Retals Return to Site 34-05 418.1 Tot. Recoverable Petroleum Hydrocarbons No. of containers matches C-of-C X X 625-8270 BNAs & Pest. (Semivolaille Organics) (soinagio ellitrioV) seiduegrud 0428-826 Sample Disposition Time XX 602/ 8020 Aromatic Hydrocarbons (BTEX) Date X 601\ 8010 Halogenated Hydrocarbons Ship Via: (lessig) seldstastk3 M3108 0.565 (enfloss) seldseging M3108 Samples not leaking まなりが かんがん 表で company dudanterna Conc: Lo 🗌 Med 🗌 Hi Manna dunk borteM gnilqms2 Line Collection × を Preservative 系统× CED Received By 35 Company Samples at 4°C Container type Date Ý G=grab Volume Receiving Lab QUANTEREA ANALYTICAL (m. 0% 4 tr COBIN WEESNED s. bens 92765 大师 1610 Time 0198-85 F RENO/NYMYG 6/4/// Samples rotro Date W=water Signature DAVIO S 3 3 6001.32 ANA 0835 Time 0935 MW08-95-4/1325 MW32-95-4/1530 1030 BN30-95-4* 1031 Sign ! MW27-95-4 H25 Sample Relinquished By Company Chin with Telephone No. (714) Printed name () ムチンドな Lab Report Recipient Sampler (signature) 1761 MW17-95-4 Please Complete MW30-95-4 Leb sample custodian My15-95-4 LABORATORY--5641119 Job Location Sample ID# Precautions: Address Job # Company

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Date 11-15-95 weather acoupy, with Page 1 of 1
Chain-of-Custody Record

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#	Sampler (signature) Printed name Lab Report Recipient	Address 1721 S. CAMO AVE. Address 1721 S. CAMO AVE. Sample ID# Time N=voil G-gorb Volus	1-5651119	MW26-95-4	MW-15-440837	4-56-42MW	MN23-45-4	12-82 WM	4-58-82MM	4-56-40MW			Precautions:	Sample Relinquished By		any		any	LABORATORY-	Leb sample custodian
Job #	Sam Prin Lab	Pec Add	12	32	32	ME	3	35	242	3			Prec	Sal	1	Company		Company	IAB E	Leb s

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Date 11-16-95 Weather - WALT Page

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Chain-of-Custody Record jo

1N TW(2) (covers Remarks SHPPET Reason for Transfer (List Shipping Bill Number) 757 8 742052036 520025 Number of Containers Ъ Total Number of Containers: Ø bo ➣ ø bo Other norg 24421 047L X XXXXXX cinteM 7920 #18.1 Tot. Recoverable Petroleum Hydrocarbons 625-8270 BMAs & Pest. (Semivolatile Organics) 624-8240 Purgeables (Volatille Organics) 10 C (O:30 Time 602\ 8020 Aromatic Hydrocarbons (BTEX) 14/17/95 Date × 501/ 8010 Halogenated Hydrocarbons ヌ Ship Via: 8015M Extractables (Dicest). (Gasoline) seidsegru9 M2108 HEL 155. 7.5% 29.10% AMM DISA Atriet anient Conc: Lo | Med | Hi Sampling Method W ST Collection Preservative Confipany OF Ź Received By CED A STATE 48 ₹ Container type C≕comp | Volume Targa Targa 4 t Receiving Lab duto TELLA fourty TICAL Lab Report Recipient REGIN WEESNER CA. 92705 14/62 Time S. ROPES PIE DATES BEITS Ċ Telephone No.(714) 258 -8610 56/31/11 Job Location Review Write Date W=water S=soil * 3 6001.32 474 Time 1515 4011 ONO 1410 1415 5911 1×6-56-01MH Sample Relinquished By 0411 ERMASSI X TH Sampler (signature) Address 1721 とからな MW03 45.4* MW03-45-4 MWOS-8-7* TBHINGS-1 HW05-45-4 4-56-01MW MW07-95-4 Sample ID# Printed name Precautions: E Company # qop

SABO

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Discard

Return to Site

Sample Disposition

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Signature 2

Cooler seals Intect

Mo. of containers matches C-of-C

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Samples at 4'C

Samples

LABORATORY-Please Complete NOFL Ruiz

Company

Company

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Date 11-16-95 Weather

Chain-of-Custody Record y o

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CLP Lequesnes COOLERS Remarks 2)cm Reason for Transfer (List Shipping Bill Number) 7 Number of Containers Do 7920526036 2002 Total Number of Containers: Cther Inorg | Cooler seals Intact 0426 2920 **elateM** 418.1 Tot, Recoverable Petroleum Hydrocarbons No. of containers matches C-of-C 625-8270 BNAs & Pest. (Semivolatile Organics) S24-8240 Purgeables (Votatile Organics) (0:30 Time SOS/ 8020 Aromatic Hydrocarbons (BTEX) 11/12/65 Date 501\ 8010 Halogenated Hydrocarbons Ship Via: 8015M Extractables (Diesel) 8015M Purgeables (Gasoline) Samples not feaking 215.F. Conc: Lo ☐ Med ☐ Hi[Sampling Method Collection 表 25 五 Preservative Company (DES Received By ICED Company 202 Samples at 4'C Container type Ston! W=water C=comp Volume S=soil G=grab Volume Receiving Lab Guarteled ANALYTICAL 14.03 Lab Report Recipient Rosin WEESNAC ArvA, CA. 92705 Time 62 N. THAND EVE. DAVIDS. BETTS 16/62 Camples Intact REDIO/NUMBER Telephone No. 714) 258-840 Date 3 3 6001.32 3 Time 1332 1013 Sample Relinquished By Sampter (signature) the Company Ch-WE37 Address 1724 LABORATORY-Please Complete MW31-95-4 MW16-95-4 SPATA Sample ID# TB111695-1 Printed name Job Location Precautions: Company # qof

days

Discard

Return to Site

Sample Disposition

1030 Time

16/2//1

Signature

Lab sample custodian

fax (602)990-0107

Chain-of-Custody Record Weather Cient wing Page Date 11-17-15

MSD days Remarks 6019 Reason for Transfer (List Shipping Bill Number) B 달 2 h Number of Containers Total Number of Containers: Other 85 Discard Inorg 5 Cooler seals Intact CHURT 04.2C 792052 **clateN** Return to Site 418.1 Tot. Recoverable Petroleum Hydrocarbons No. of containers matches C-of-C X 525-8270 BMAs & Pest. (Semivolatile Organics) 624-8240 Purgeables (Volatile Organics) Sample Disposition Time <u>8</u> 178 FE 502/ 8020 Aromatic Hydrocarbons (BTEX) Date 5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 ERM anodiscontyl betanegolal 0108 \r05 Ship Via: 8015M Extractables (Diesel) (Gacilnes) seldaegud Mčr08 Samples not leaking DIST. BALEK 215 F. Time (10:07) Company DOAN TER RA Ī Sampling Method Collection 育 Med と主义一マシ Preservative ICED Received By Conc: Lo Series Constitution STATE OF Company Samples at 4.C Container type 8.4/ Receiving Lab Oversela ANASTICAL C=comp Volume Grand 14.042 Lab Report Recipient Rubin Weesner 120 S. ETRAND AVE Time DAND S. BETTS SANTA ANA, CA. 82705 714)258-8610 1 T Ŀ Samples Intact 11/8 マンシ Date Signature W=water S=soil 3 3 3 6001.3 0845 Time 0830 Renzo Sample Relinquished By · Fith ELM-WEST Sampler (signature) Address 1721 LABORATORY-Please Complete MW25-95-4 NOT KW 2 18111195-1 2-56-4 Telephone No. Sample ID# Printed name Job Location Precautions: 4 A 135 Company Company 1ob#

APPENDIX F

LOCATIONS OF REPOSITORIES OF ANALYTICAL DATA AND QUALITY ASSURANCE/QUALITY CONTROL EVALUATION RESULTS Copies of the original laboratory data and ERM's data validation reports are available for public examination at three storage repositories. The repository location, address, and appropriate contact persons are listed below:

Repository Location	Address	Contact Person, Phone Number, and Facsimile Number
Nevada Air National Guard Base, Reno, Nevada	1776 National Guard Way Reno, Nevada 89502-4494	Major John Peck Phone: 702-788-4503 Facsimile: 702-788-4797
Nevada Department of Conservation and National Resources, Division of Environmental Protection	Capitol Complex Carson City, Nevada 89710	Mr. Arthur G. Gravenstein Phone: 702-687-4670 (Extension 3032) Facsimile: 702-885-0868
Air National Guard /CEVR/HQ	Building R-47 3500 Fetchet Avenue Andrews Air Force Base, Maryland 20762	Mr. Michael Frey Phone: 301-836-8903 Facsimile: 301-836-8121

APPENDIX G

INVESTIGATION DERIVED WASTE MANAGEMENT

TABLE G-1

Investigation Derived Waste Recommendations - Soil Matrix 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Well/Boring Location	Soil Analysis Performed?	Maximum TPH Concentration, mg/kg	Maximum PID Reading, ppm	Recommendation	Comments
SB7T-1	No	NA	522	Lockwood Landfill	Encountered free product during drilling
SB7T-2	No	NA	283	Lockwood Landfill	Encountered free product during drilling
SB7T-3	No	NA	2135	Lockwood Landfill	Encountered free product during drilling
SB7T-4	No	NA	763	Lockwood Landfill	Encountered free product during drilling
MW28	No	NA	0.0	Disposal on Base	In the vicinity of boreholes with no TPH detections (SB4-2, SB4-3, SB4-4)
MW29	No	NA	0.1	Disposal on Base	In the vicinity of boreholes with no TPH detections (SB4-2, SB4-3, SB4-4)
MW30	No	NA	0.0	Disposal on Base	TPH detection in SB5-2
MW31	No	NA	0.0	Disposal on Base	No TPH detection in SB7-4 (closest borehole to MW31)
MW32	No	NA	0.0	Disposal on Base	Upgradient of Site 5
SB4-1	Yes	ND		Disposal on Base	
SB4-2	Yes	CN		Disposal on Base	
SB4-3	Yes	3.42		Disposal on Base	
SB4-4	Yeu	ND		Disposal on Base	
SB4-5	Yes	1400		Lockwood Landfill	
SB4-6	Υ	192		Lockwood Landfill	
SB4-7	Yes	ND		Disposal on Base	
SB5-1	Yes	ND		Disposal on Base	
SB5-2	Yes	288		Lockwood Landfill	<u> </u>
SB5-3	Yes	ND		Disposal on Base	
SB5-4	Yes	ND		Disposal on Base	
SB7-1	Yes	1000		Lockwood Landfill	
SB7-2	Yes	560		Lockwood Landfill	
SB7-3	Yes	222		Lockwood Landfill	
SB7-4	Yes	ND		Disposal on Base	
SB7-5	Yes	1010		Lockwood Landfill	Encountered free product during drilling
SB7-6	Yes	4.31		Disposal on Base	
SB7-7	Yes	5520	ļ	Lockwood Landfill	ļ
SB7-8	Yes	40.8	ļ	Disposal on Base	
SB7-9	Yes	3.58	ļ	Disposal on Base	
SB7-10	Yes	170		Lockwood Landfill	<u> </u>
SB7-11	Yes	908		Lockwood Landfill	
SB7-12	Yes	ND	ļ	Disposal on Base	
1					
SB14-1	Yes	ND		Disposal on Base	
SB14-2	Yes	ND		Disposal on Base	
SB14-3	Yes	2500		Lockwood Landfill	
SB14-4	Yes	ND		Disposal on Base	
SB14-5	Yes	ND		Disposal on Base	

PID = Photoionization Detector TPH = Total Petroleum Hydrocarbons mg/kg = milligrams per kilogram ppm = parts per million

Investigation Derived Waste Recommendations - Water Matrix 152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Well Location	Waste Type	Recommendation	Comments
MW28	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW29	Water and Purge Water	Discharge to Sanitary Sewer	
MW30	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW31	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW32	Water and Purge Water	Discharge to Sanitary Sewer	
MW03	Purge Water	Discharge to Sanitary Sewer	
MW04	Purge Water	Discharge to Sanitary Sewer	
MW05	Purge Water	Romic Chemical Company*	Trichloroethylene and benzene concentrations exceed MCLs
MW17	Purge Water	Romic Chemical Company	Benzene concentraitons exceed MCLs
MW10	Purge Water	Discharge to Sanitary Sewer	
MW06	Purge Water	Romic Chemical Company	Benzene concentrations exceed MCLs
MW07	Purge Water	Romic Chemical Company	Benzene and bis(2-ethylhexl)phthalate concentrations exceed MCLs
MW25	Purge Water	Romic Chemical Company	Benzene and bis(2-ethylhexl)phthalate concentrations exceed MCLs
MW31	Purge Water	Discharge to Sanitary Sewer	
MW23	Purge Water	Discharge to Sanitary Sewer	
MW24	Purge Water	Discharge to Sanitary Sewer	
MW15	Purge Water	Discharge to Sanitary Sewer	
MW18	Purge Water	Discharge to Sanitary Sewer	
T-4	Purge Water	Romic Chemical Company	Benzene, bis(2-ethylhexl)phthalate, and toluene concentrations exceed MCLs

^{* =} Off-site transport and treatment. Recommend bulk shipment option. Romic can transfer contents of existing drums into one tank for transport.